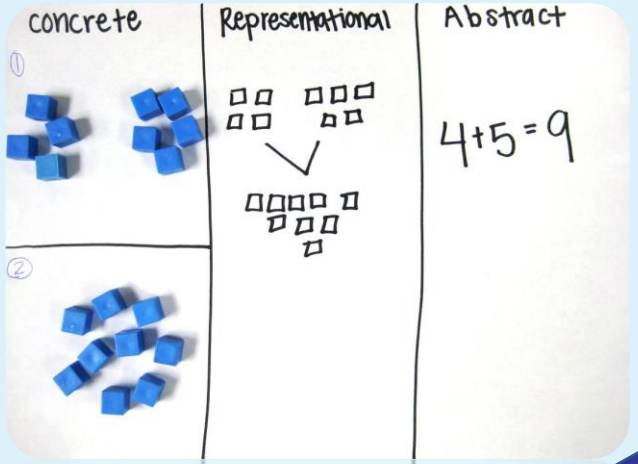
Primary Mathematics Coffee Morning



GEMS FirstPoint School

Thomas Short - Year 5 Teacher and Primary Maths Lead -

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Overview

- Mastery Maths and HPL at FPS
- Key documents for your reference.
- CPA approach. Why?
- Lesson structure - What does a typical lesson look like? – Mastery approach and retrieval-based practice.
- Assessment Process
- Why we do what we do- underpinned by research.
- How you can support at home – websites, activities and resources.
- Q&A

Our Vision

Our goal at GEMS FPS, is to provide students with a personalised learning journey which encourages critical thinking and exploration of Mathematical concepts. Through the "**Mastering the Curriculum**" approach we offer a **seamless transition** through all phases of learning. Where teachers and students alike are confident in their next steps to further their progress and challenge their understanding. The curriculum is mathematically rich, offering students opportunities to communicate their ideas and results effectively, and **learn independently where technology is an essential component of their environment**. Through a consistent mastery approach, we believe our students will become **confident, efficient, and flexible problem solvers.** Alone or in groups and with access to technology, they work productively and reflectively, with the skilled guidance of their teachers. Students confidently engage in complex mathematical tasks chosen carefully by teachers. They value mathematics and engage actively in the subject, **taking pride in their work**. Students will meet and exceed the high expectations set by all teachers. Our aim is that **students at FPS will be working beyond their age-related expectations**.

High Performance Learning

Collaborating

Real-life Maths contexts

Confidence to take on challenges

Meta-thinking

Linking prior learning

Exploring different strategies

Self assessment and reflection

Empathy

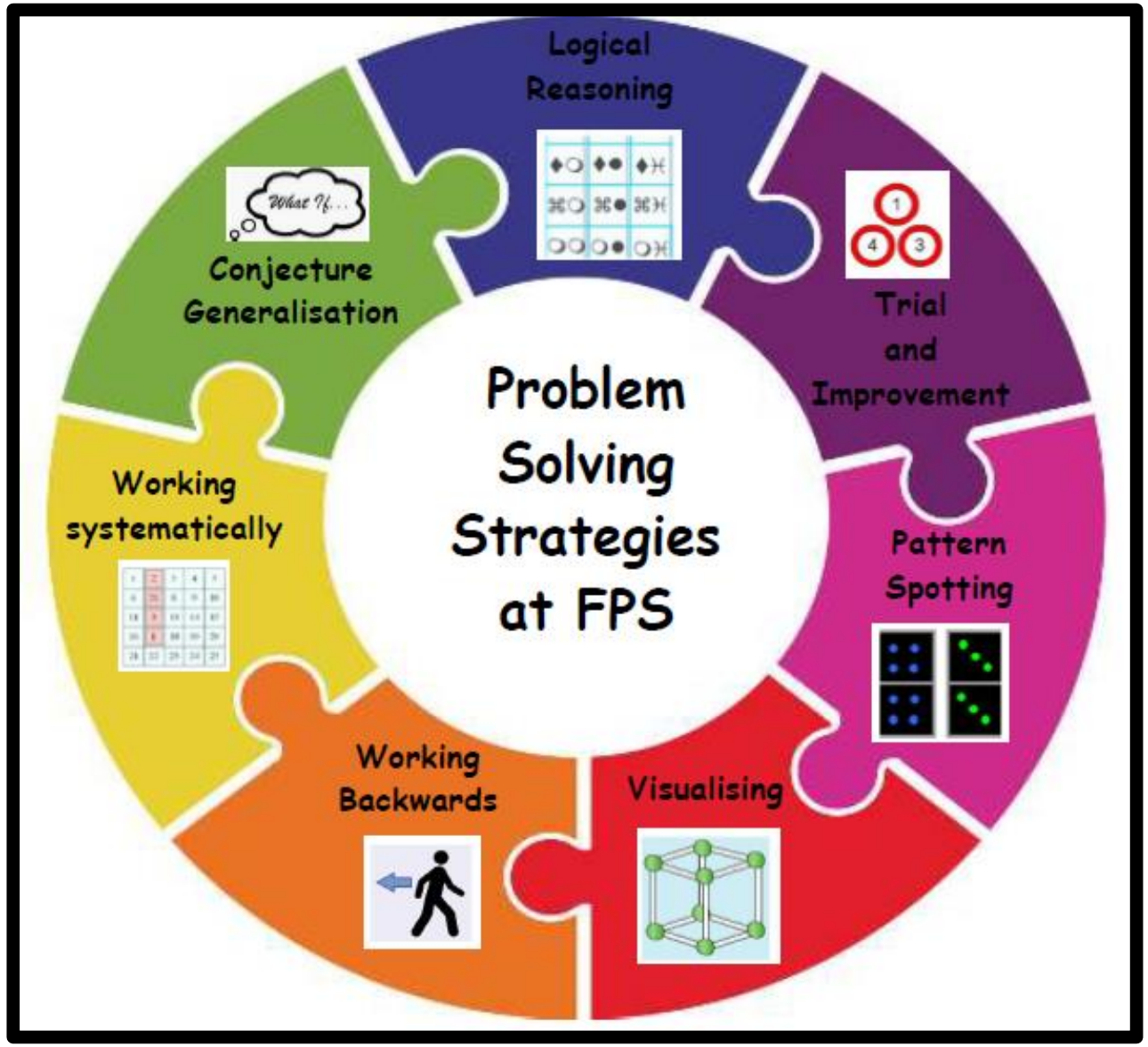
Hard-working

Challenge

Problem solving and reasoning

Building resilience

Problem Solving Skills at FPS

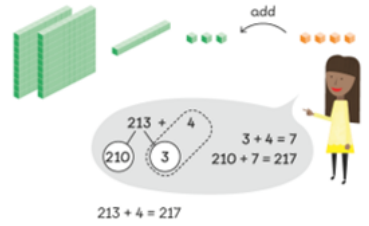
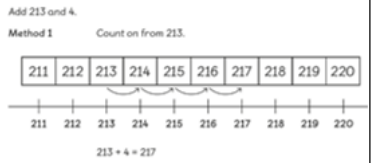
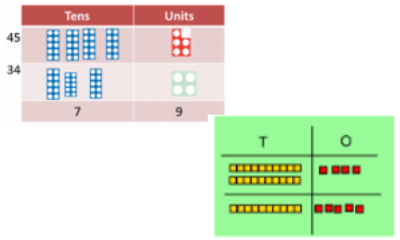
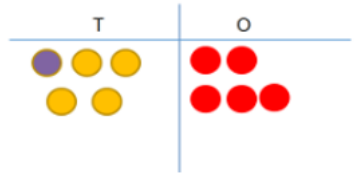


Key documents

2- ELGs ‘on-track’

3- Curriculum adaptations guided by data. MTP

1- Calculation policy 2023-24

Key Stage 2 Year 3.			
Objectives and Strategies	**Concrete**	**Pictorial**	**Abstract**
Add a three-digit number and ones mentally (175 + 8)	Use of dienes to combine two amounts. Children to recognise they are only adding ones, but this could lead to crossing a tens boundary. 	Children to use a number track or number line to count on from the given number. 	Children should not be encourgaed to use a formal written method when adding only a single digit. Mental strategies should be priority.
Add two or three 2 or 3digit numbers. (No regrouping) using a formal written method.	Continue to build on skills taught in year 2 but with increasingly larger numbers. Children could be confident with adding each column and understanding the value each digit has in the final answer. 	Children to use jottings or drawings of counters to demonstrate their understanding. 	2 2 3 + 1 1 4 3 3 7 Children to lay their calculations out in columns and understand that we must begin to add starting in the ones column.

Underpinned by a rigorous assessment cycles.

On track

Mathematics FS2 (Reception)

This document is supported by, Birth to 5 Matters and Development Matters

Progression of skills document.

	Autumn	Spring	Summer
Number	• Recognise and represent numbers 1-10 in a variety of ways Example: 5frame, numicon, cubes, digits, tally, pictures, dots on a dice, words, etc. • Subitise 1-3 items • Work out 1 more/1less using objects/number line (1 to 10) • Know the number bonds to 5 (addition) • Exposed to doubles through number blocks/fingers (1 and 1 makes 2 (1 – 5)	• Use a whole/part or part model with concrete objects to partition and recombine the amount to 10 • Subitise 5 amounts on a dice and a tens frame • Use a tens frame model to represent numbers to 10 and add and subtract sums to 10 • Know number bonds to 10 (addition) • Double numbers 5 to 10 using objects	• Show a more complex understanding of the composition of a number when in a provision for example 2p, 2p, 1p and the same again makes 10p altogether. • Subitise in different context such as when counting using equipment in the indoor and outdoor provision • Know number bonds to 2 (subtraction) • Recall number bonds to 5 and some to 10 • Recall some double facts from memory ***Closing the gap between FS – Yr 1 (On track + / Above) Readiness for Yr 1*** • Read and write numbers from 1 to 20 in numerals and words. • Read, write and interpret mathematical statements involving addition (+) subtraction (-) and equals (=) signs. • Represent and use number bonds and related subtraction facts within 20. • Add and subtract one-digit and two-digit numbers to 20, including zero. • Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = [] - 9.
Numerical Patterns	• Counts objects, actions, sounds to 10 accurately and orders numbers 1 to 10 • Compares numbers and quantities up to 10 using vocabulary more than, less than, fewer, greater than, the same as, equal to • Continue, copy and create an AB and ABC pattern • Begins to explain the composition of numbers with the support of visual aids such as tens frames and Number blocks characters • Shows awareness of shape similarities and differences between objects • Enjoys partitioning and combining shapes to make new shapes with 2D and 3D shapes • Use vocabulary related to length when comparing objects	• Counts to 20 by rote and uses objects to count in 2s with support • Compares quantities and uses symbols for greater than, less than or the same as the other quantities • Continue, copy and create AB pattern focusing on even and odd numbers • Show the composition of numbers up to 10 e.g. I can make 6 with 3+3 or 4+2. (Partition amounts into equal groups) • Use informal language and analogies, (e.g. *heart-shaped and hand-shaped leaves*), as well as mathematical terms to describe shapes • Enjoy composing and decomposing shapes, learning which shapes combine to make other shapes • Use own ideas to make models of increasing complexity, selecting blocks needed, solving problems and visualising what they will build • Use vocabulary related to weight when comparing the objects	• Verbally counts beyond 20 and recognises the pattern of the counting system (10s) • Compares quantities in a variety of ways such as while playing games and keeping a tally mark score and say who is the winner • Use numerical patterns such as counting in 2sand 5s • Solve practical problems by sharing into equal groups • Can names 2D and 3D shapes and its properties. • Plays with shapes and uses them for a purpose • Use vocabulary related to capacity when comparing objects. ***Closing the gap between FS – Yr 1 (On track + / Above) Readiness for Yr 1*** • Identify one more and one less to any given a number. • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. • Solve practical problems that involve combining groups 2, 5 or 10, or sha through play • Recognise and name common 2D and 3D shapes, including circles, triangles, rectangles (including squares), pyramids, spheres and cuboids
Check Points	**An 'On Track' child for Numbers** should be recognising numbers 1-10 and know its value as well. They should know to subitise 1-3 items in a variety of ways and be able to say 1 more or 1 less than a number using objects or number line (1 to 10). They should be able to say the double of a number 1 to 5. **An 'On Track' child for Numerical Patterns** should be accurately count a range of objects to 10. They should compare numbers and quantities up to 10 using the correct mathematical vocabulary. They should explore objects and continue, copy and create patterns. **They should explore shapes and show similarities and differences between objects, make new shapes with 2D and 3D shapes**	**An 'On Track' child for Numbers** should use a whole/part or part model with concrete objects to partition and recombine the amount to 10. They should subitise 5 amounts on a dice or on objects. They should use the tens frame to add and subtract and to know the number bonds to 10. They should double numbers 5 to 10 with objects and recall the double facts of 1 to 5. **An 'On Track' child for Numerical patterns should** should count to 20 and use objects to count in 2s. They should compare quantities and use symbols for greater than, less than or the same as the other quantities. They should continue, copy and create AB pattern focusing on even and odd numbers. **They should use informal language and analogies, (e.g. *heart-shaped and hand-shaped leaves*), as well as mathematical terms to describe shapes. They should enjoy composing and decomposing shapes, learning which shapes combine to make other shapes. They should use own ideas to make models of increasing complexity, selecting blocks needed, solving problems and visualising what they will build**	**Statutory** **ELG: Number** - Have a deep understanding of number to 10, including the composition of each number; - Subitise (recognise quantities without counting) up to 5; - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **ELG: Numerical Patterns** - Verbally count beyond 20, recognising the pattern of the counting system; - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

<u>Criteria for greater depth –</u> Once children have obtained the ELG staff start to observe the <u>skills</u> and <u>attitudes to learning</u> below to see if students are demonstrating working at Greater Depth

- Using skills independently in the continuous provision without adult support. For example, writing/subitising numbers in the role play area
- Using knowledge of other aspects and making links to support their learning further
- Knowing and wanting to improve their work.

Curriculum adaptations- guided by data

Medium Term Plans

- Structure and journey of objectives
- Adaptions linked to progress test data. GL Assessment PTM (Progress Test Maths).
- Live working document for teaching staff term by term.
- -Curriculum mapping, review and reflect opportunities for staff.

Term 1A Y5			
Week 2	**Week 3**	**Week 4**	**Week 5**
Flashback 4 Test style questions linked to addition and subtraction from Y4 (4-digit numbers) **GL Style Y5 focus Questions added to PowerPoints**	~~Flashback 4~~ Identifying place value of each number, problem linked to rounding e.g. school trip buses **GL Style Y5 focus Questions added to PowerPoints**	~~Flashback 4~~ ~~Area and perimeter Y4- addition and subtracting working out missing sides~~ **Y5 PT Outcome focus- Total and order questions** **Fluency of facts and procedures** **Geometry problem solving.**	Flashback 4 (Y4) and GL style questions (PV, 4 operations, plotting graphs)
Number (Place value) Powers of 10, finding 10/100/1000 more and less, partitions, compare and order and number lines up to 1,000,000	**Number (Place Value)** Rounding 10, 100, 1,000, 100,000 and 1,000,000 **INT- Morning review with SEND**	~~**Addition and subtraction**~~ ~~Mental strategies, addition and subtraction, rounding to check~~ **Number (Place Value)** Roman numerals up to 1000, understanding place value to number up to 10,000, 100,000 and 1,000,000, reading and writing	**Addition and subtraction** Problem solving, inverse operations, find missing numbers, compare calculations

KS1 Termly Assessments

Each term, there will be an assessment week for both Y1 and Y2. The assessment week data as well as the learning that takes place daily will support teachers in planning next steps for the students in their class.

Year 1 and Year 2

- 2 papers in total

- 1 arithmetic paper which will be delivered in manageable chunks
- Transcription and paper questions
- Practising arithmetic strategies from the Y1 and Y2 curriculum

- 1 reasoning paper with 25 questions which will be delivered in manageable chunks.
- Transcription and paper questions.
- Explore different contexts and strategies.
- Coverage of current learning and prior learning.

- **Triangulation** – Assessment week, daily teaching and learning, and evidence in books.

Additional maths interventions will take place to provide further support and to enhance learning throughout the year.

KS2 Termly Assessments

Each term, there will be an assessment week for Y3, Y4, Y5 and Y6. The assessment week data as well as the learning that takes place daily will support teachers in planning next steps for the students in their class.

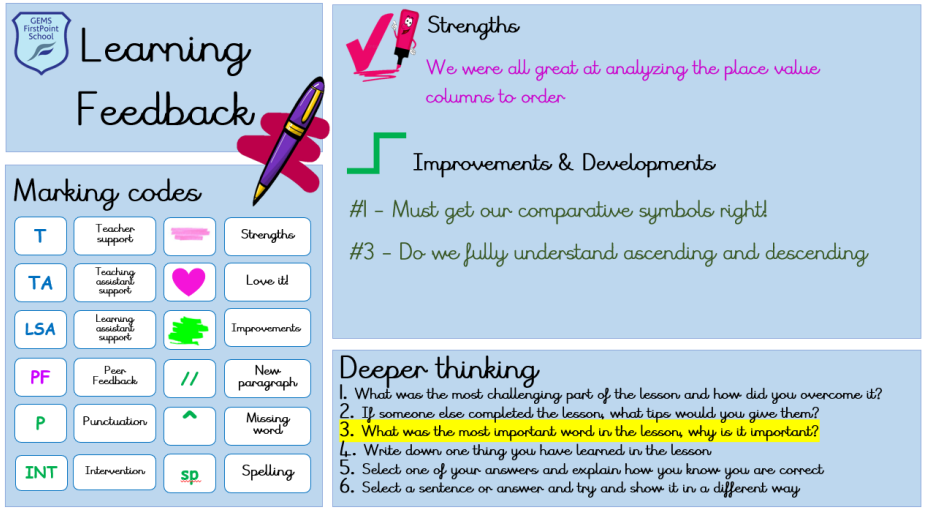
Years 3, 4, 5 and 6 - 3 papers in total

- 1 arithmetic paper
- Practicing arithmetic strategies from the age-related curriculum.

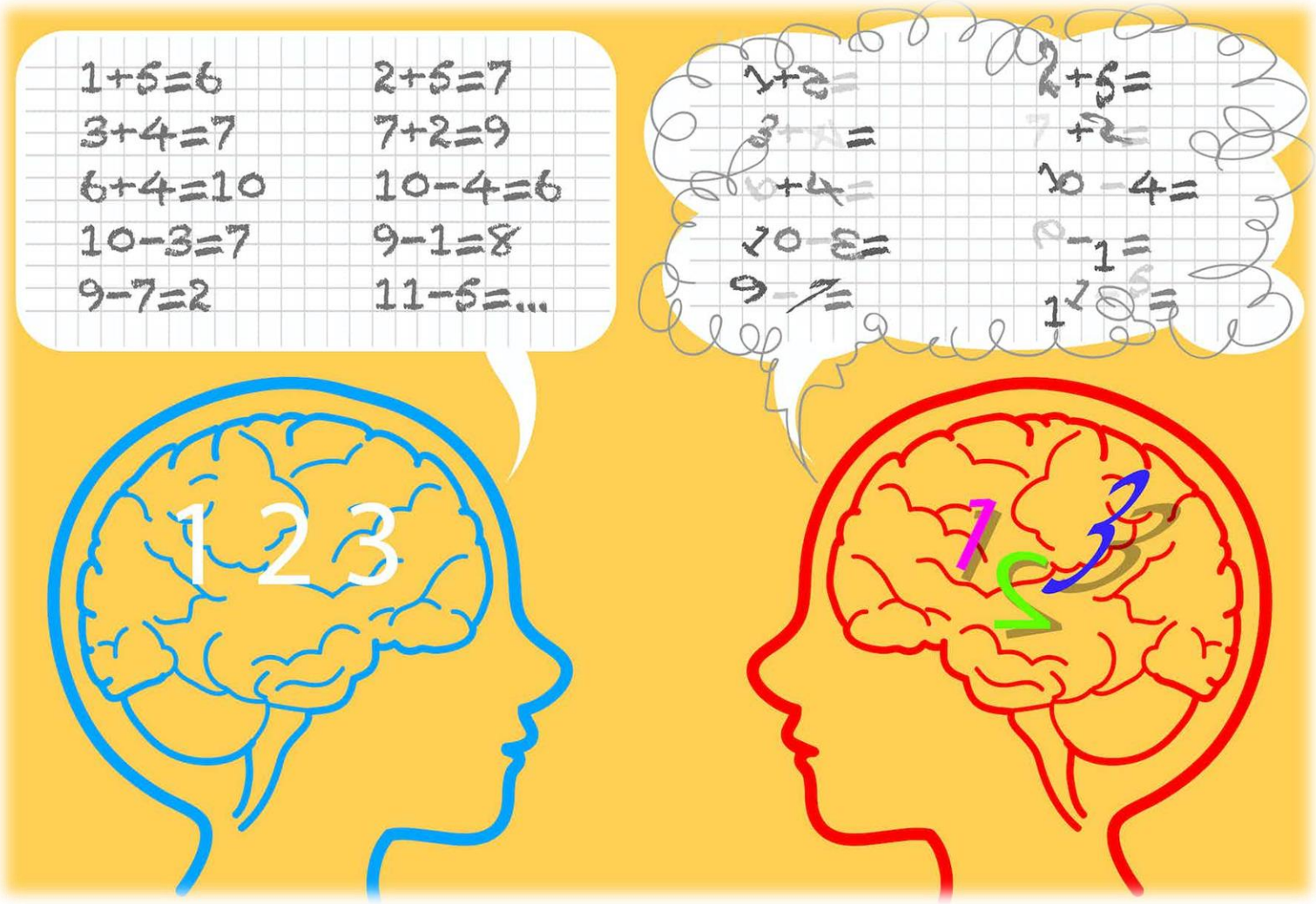
- 2 reasoning papers
- Explore different contexts and strategies.
- Coverage of current learning and prior learning.

- Triangulation – Assessment week, daily teaching and learning, and evidence in books.

Additional maths interventions will take place to provide further support and to enhance learning throughout the year.

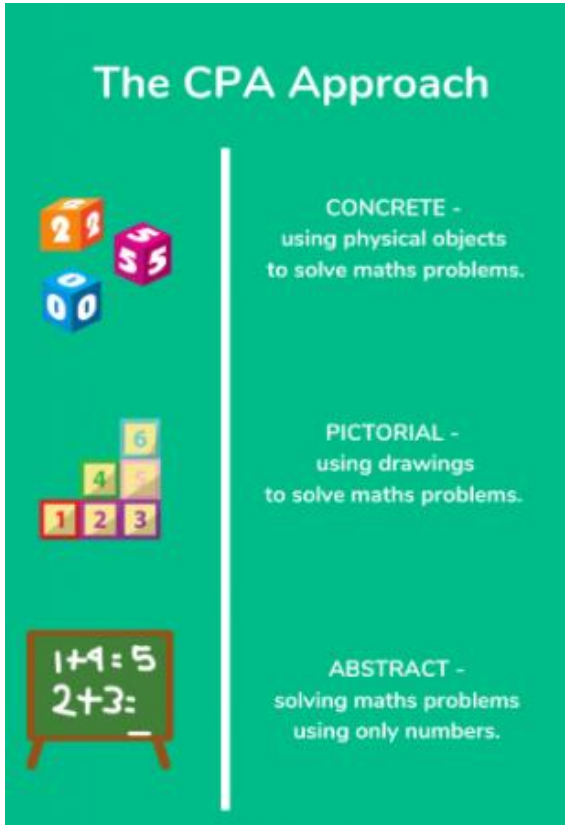


Supporting <u>all</u> mathematicians at FPS



What is the CPA approach?

Concrete, Pictorial, Abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of Maths in pupils. Often referred to as the concrete, representational, abstract framework, CPA was developed by American psychologist Jerome Bruner.



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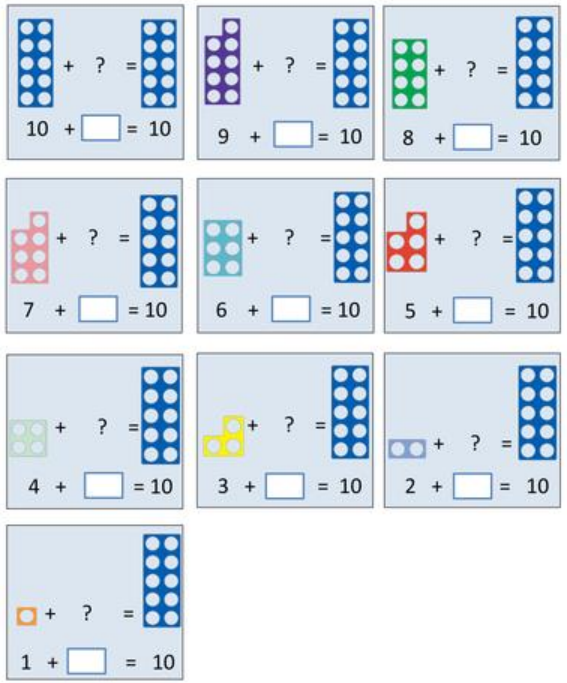
Concrete

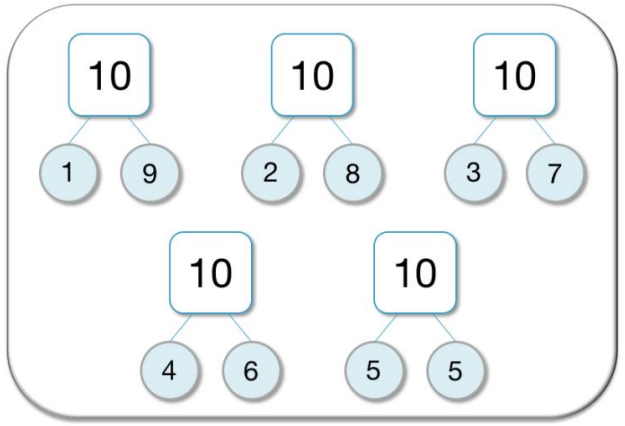
Concrete is the "*doing*" stage. During this stage, students use concrete objects to model problems. Unlike traditional Maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects. With the CPA framework, every abstract concept is first introduced using physical, interactive concrete materials.

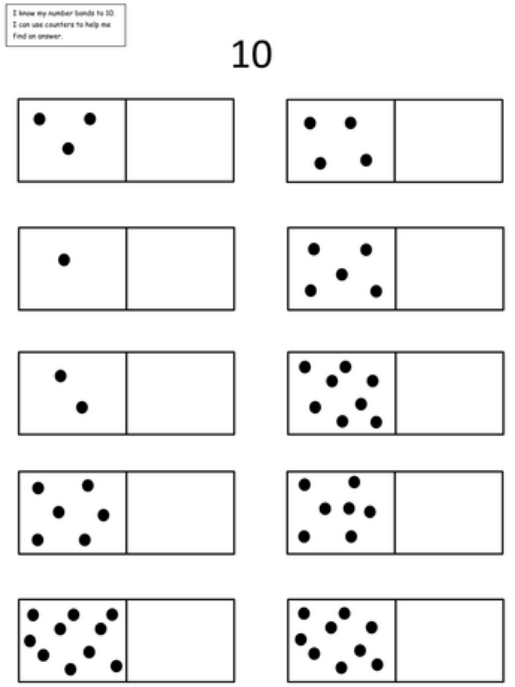
For example, if a problem involves adding pieces of fruit, children can first handle actual fruit. From there, they can progress to handling abstract counters or cubes which represent the fruit.

Pictorial

Pictorial is the "*seeing*" stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem. Building or drawing a model makes it easier for children to grasp difficult abstract concepts (for example, fractions). Simply put, it helps students visualise abstract problems and make them more accessible.







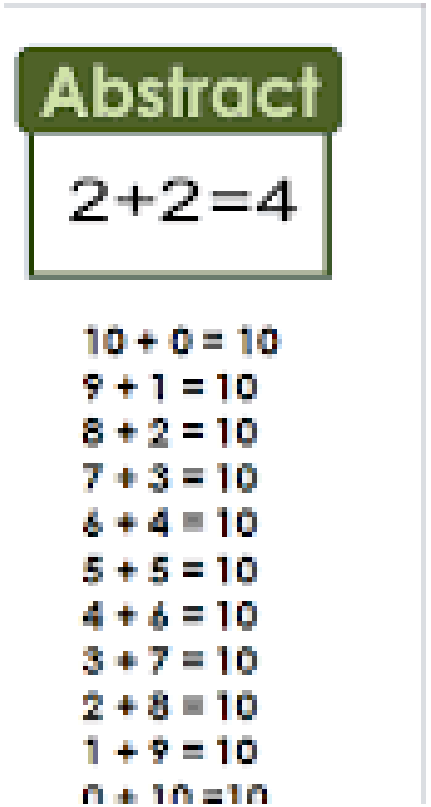
We see **genius** in every child

Abstract

Abstract is the “symbolic” stage, where children use abstract symbols to model problems.

Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem. The abstract stage involves the teacher introducing abstract concepts (for example, mathematical symbols).

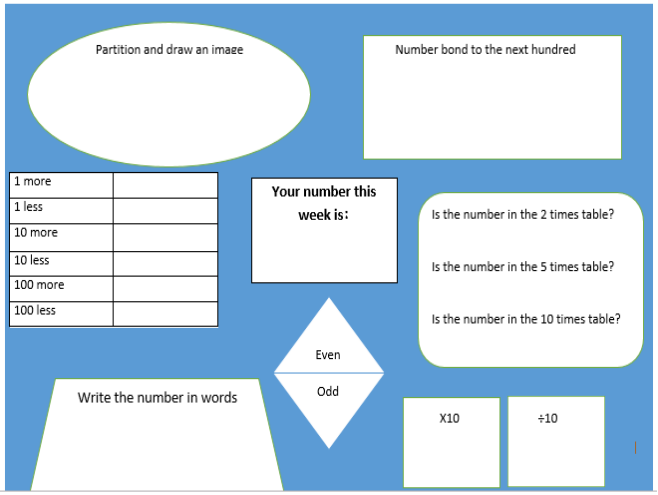
Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, +, –, x, /) to indicate addition, multiplication or division.



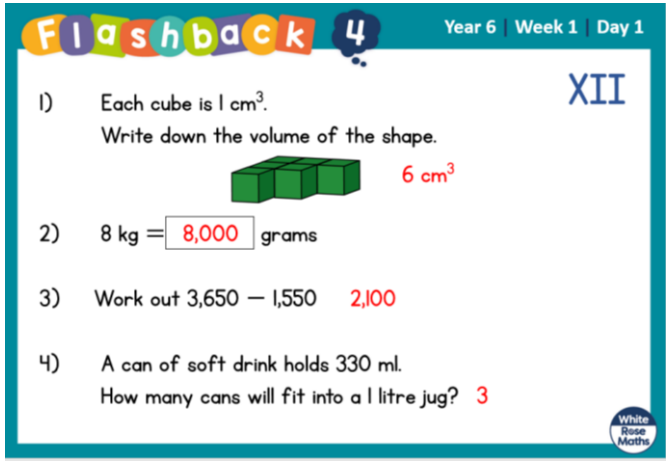
Arithmetic Starter

4 - 10 questions, short very fast paced sharing session.

Daily repetition to develop competency.



1.) 0 + 5	2.) 80 × 5	3.) 65 ÷ 5
4.) 475 − 27	5.) 798 + 554	6.) 776 − 364
7.) 29 × 271	8.) 0.02 × 0.1	9.) 0.5 − 0.03



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Anchor Task

Teddy is comparing $\frac{3}{8}$ and $\frac{5}{12}$

To find the lowest common multiple, I will multiply 8 and 12 together.
$8 \times 12 = 96$
I will use a common denominator of 96

Is Teddy correct?
Explain why.

Bar Model?

The teacher will share a problem that the whole lesson is centered around. At this point in the classroom, the children would explore the problem for themselves in groups, but independent of the teacher. Pupils are encouraged to lead the investigation and are asked open questions.

Concrete resources?

Dienes?

Pictorial?

What is the problem asking you to do?

What do you already know to help you solve this problem?

Could you use any resources to help you?

Could you draw a picture to help you?

What methods could you use to solve this problem?

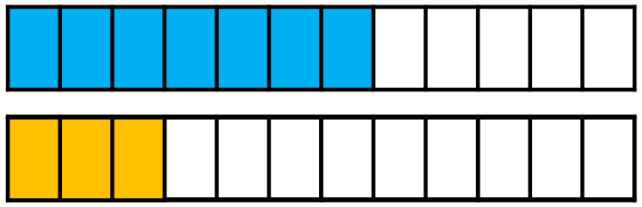
How many different methods could you use?

Focused Teaching and Guided Practice

Here, the class work through the problem together.

It is important to talk through any key vocabulary so that children understand the mathematical language used. This part of the lesson aims to guide learning, expose misconceptions, prompt discussions or encourage learners to justify their reasoning.

It is important for learners to compare different methods, evaluating each one and validating their own discoveries, as well as learning how to present their ideas effectively.

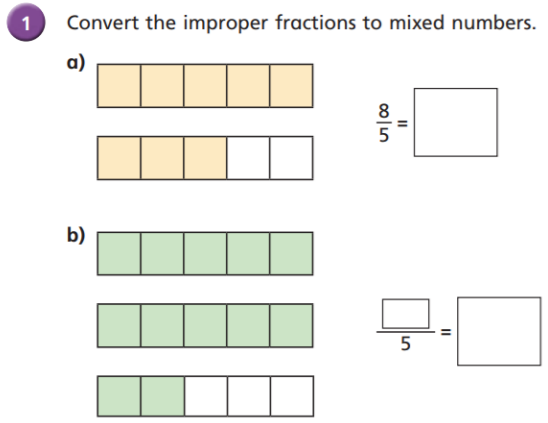


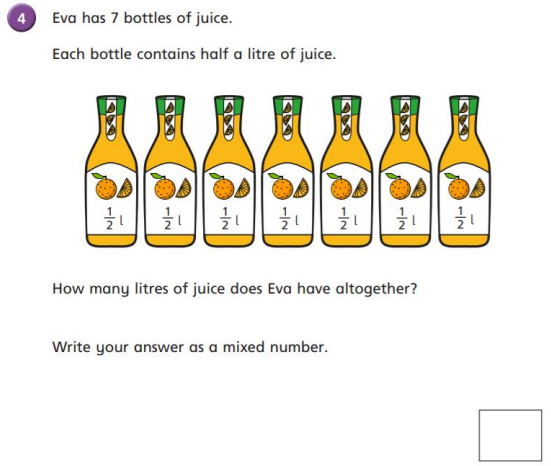
$$\frac{7}{12} + \frac{1}{4} \xrightarrow{\times 3} \frac{3}{12}$$

$$\frac{7}{12} + \frac{3}{12} = \frac{10}{12} = \frac{5}{6}$$

Practice/Independent Work

The teacher will now share a handful of problems that link to the original anchor problem. In class, learners can complete these independently, in pairs or groups, using the methods learnt in the lesson. This enables the children to practice what they have learnt. If children appear to be struggling, teachers will not rush to give them the answers and children are encouraged to be resourceful. They have been taught to be problem solvers, struggling allows them to push their understanding of the concepts and learn to manipulate the mathematics.





Opportunities for challenge and 'Get Stuck' moments, live feedback and review points.

Consolidation

Further application.

Address misconceptions.

Explain and reasoning.

Teach the Teacher

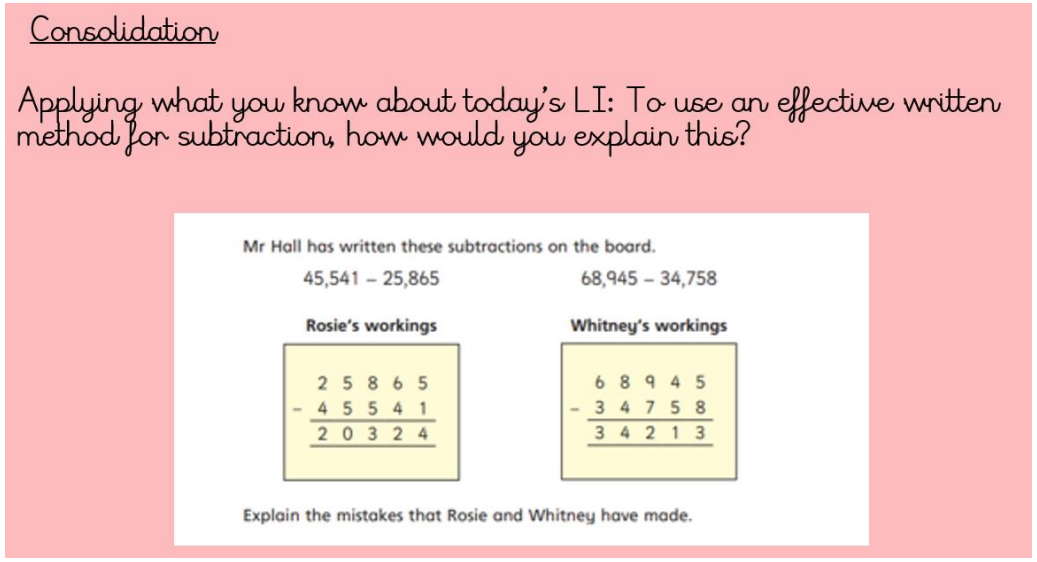
True or False?

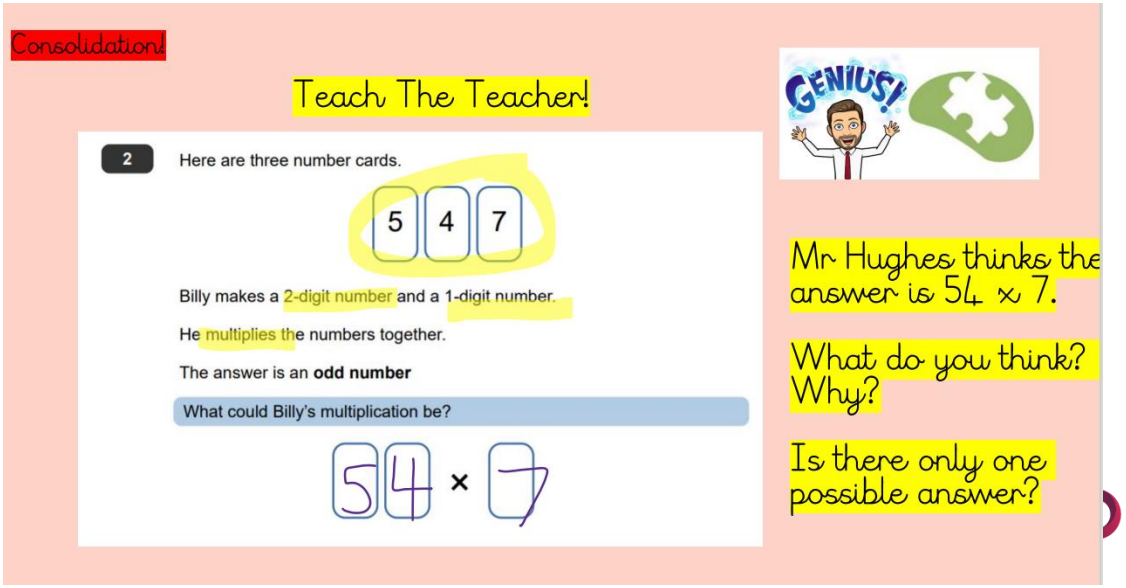
Convince Me!

Can the children apply what they know to an unseen problem?

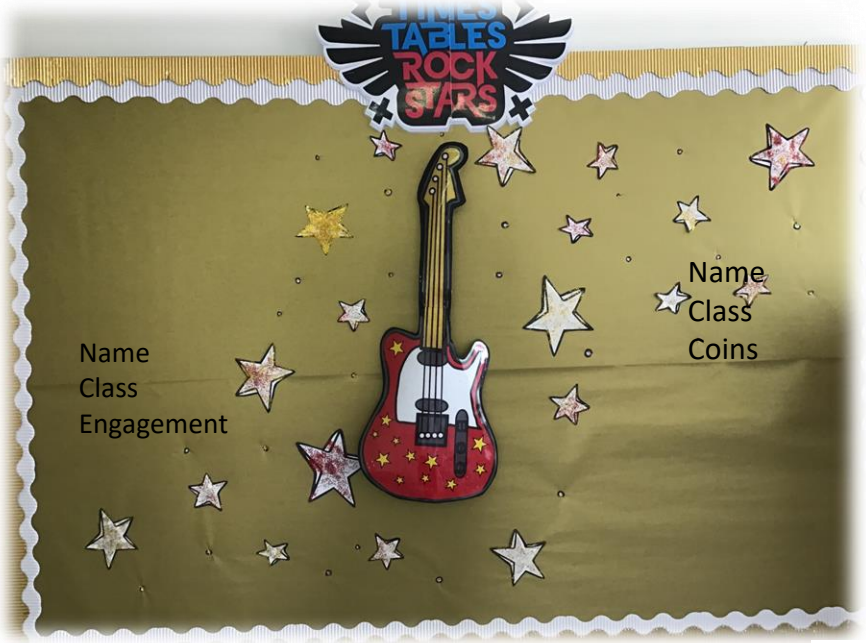
Are they able to find multiple ways of solving the problem?

Can they explain their understanding?





Raising the profile of maths and enrichment



- TTRS Champions and engagement recognition
- Century Champions
- Maths Ambassadors
- Enrichment Challenges- KenKen

  Cluster Competitions
- STEAM Week

CENTURY

Maths Ambassador

POWER OF STEAM

SCIENCE TECHNOLOGY ENGINEERING ART MATHEMATICS

KENKEN

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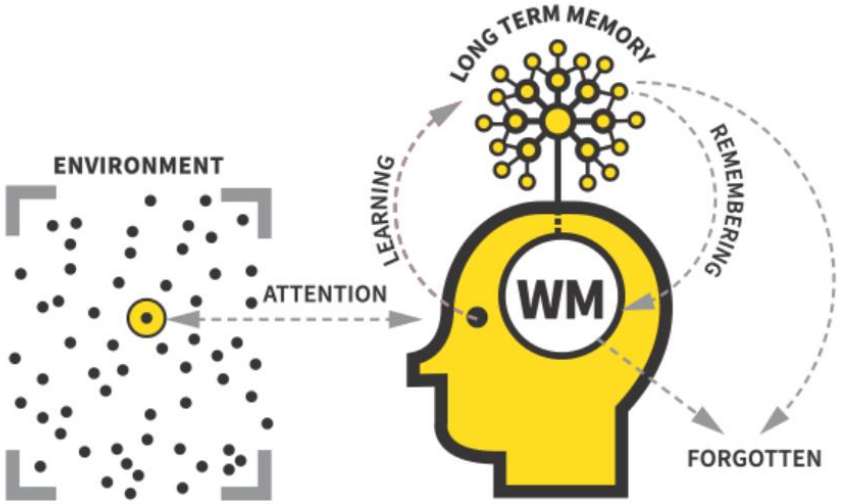
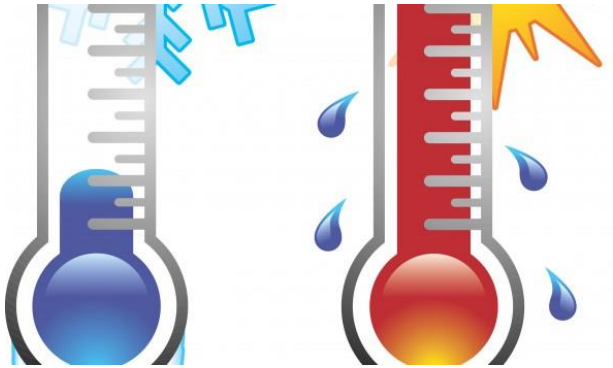




Lack of prior knowledge: students will often not have a sufficiently well developed schema (neural pathways) for the concepts being taught to make sense of or **retain** the new knowledge they receive year on year.

Solution: develop a broad curriculum packed with knowledge and experiences across multiple interlocking domains that allow students to fill in knowledge gaps and broaden their schema.

We **Check students' prior knowledge** as a routine element of teaching rather than making assumptions.

Tom Sherrington www.teacherhead.com
Rosenshine's Principles- A brief guide to Rosenshine's 10 Principles of Instruction (innerdrive.co.uk)

How can you support at home?

Weekly newsletter highlights what has been taught, this is sent weekly by teachers. Keep an eye out for mathematics related content shared.

Promote use:

- Century for Year 2- Year 6
- Education City FS1, FS2 and Year 1

Learning is always available for pupils **to revisit, revise and reflect.**

Trial:

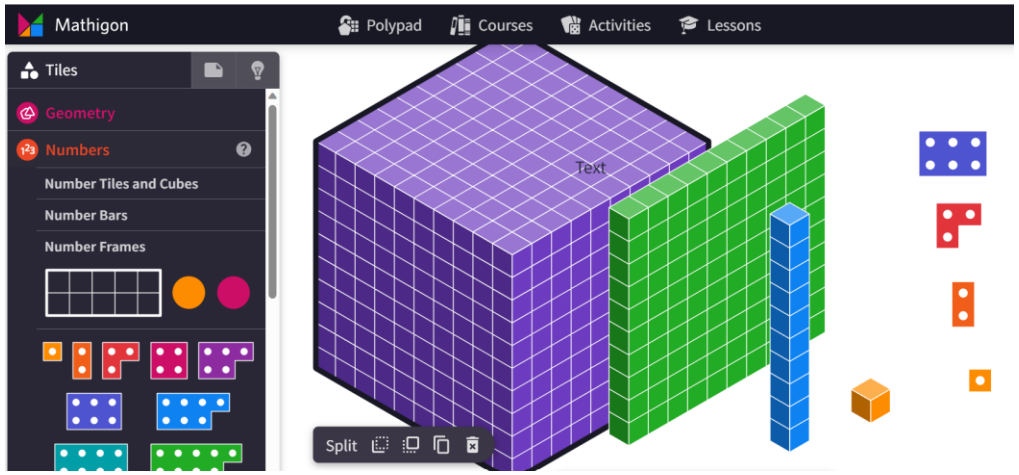
- Pie Corbett Maths
- Polypad- Mathigon

https://corbettmathsprimary.com/5-a-day/

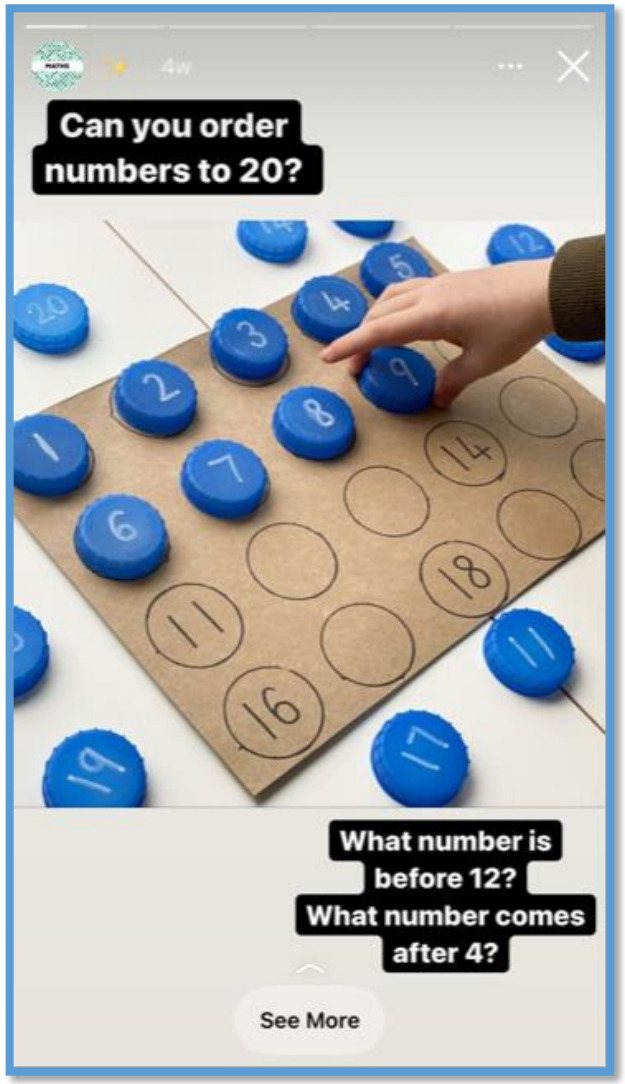
Primary 5-a-day

19th September Bronze Silver Gold Platinum

https://magithon.org



Learning through play



A super page to follow, full of exciting learning ideas!

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Thank you