Mastery in Maths
Parents Information Session

St Vincent's Catholic Primary School

Tuesday 28th January 2020

Aims

- To learn about the Maths Mastery approach and how it is taught at St Vincent's.
- To give ideas and resources to support maths learning at home.
- To see a snapshot of Maths Mastery teaching in action.

The Maths Curriculum

The National Curriculum for Mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics so that they have the ability to recall and apply knowledge rapidly over time.
- **Reason mathematically**.
- **Solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into series of simpler steps and persevering in seeking solutions.

The Maths Curriculum

The National Curriculum states:
The expectation is that a 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.
Those pupils who are not sufficiently fluent with earlier material should have additional support and practice.

Introduction of Maths – No Problem!

- Based on the evidence-based approach developed in Singapore
- Fully aligned with the 2014 English National Curriculum for maths
- The Maths — No Problem! Primary Series was assessed by the DfE's expert panel, which judged that it met the core criteria for a high quality textbook to support teaching for mastery
- By incorporating established learning research into a highly effective approach, Singapore has become a "laboratory of maths teaching". The Primary Maths Series is founded on the international research of Piaget, Dienes, Bruner, Skemp and Vygotsky and has been tested and refined over the last 30 years in Singapore.

What does Maths Mastery look like at St Vincent's?

- High expectations for every child.
- Depth before breadth - a rigorous and systematic approach where small steps are taught but at a greater depth.
- All children work on the same objective.
- Topics taught in larger chunks and connections are made between topics.
- It provides a deep understanding of the subject through the use of objects, i.e. manipulatives, pictures and diagrams before numbers and letters.
- Problem solving is a key part of the lesson.
- Mathematical vocabulary is used precisely and is modelled and practised throughout.
- Challenge is provided through questioning, tasks and extending thinking.
- A child's mindset is seen as key.

Differentiation and Depth

Do you agree? E.g. is the answer T or F? Explain your reasoning.

Explicit use of misconceptions and mistakes.

Probing questions E.g. convince me, What's the same? What's different?

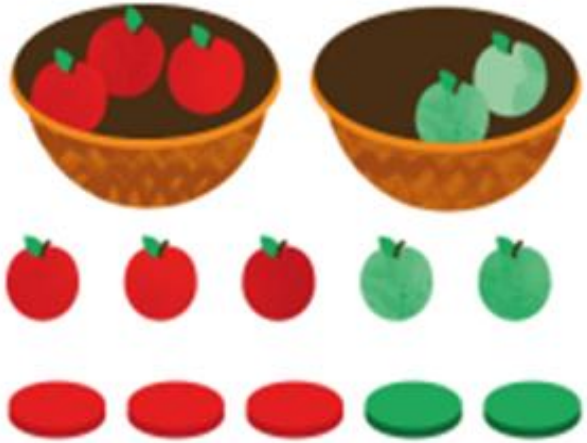
The missing digit/ symbol e.g. 171 - ? = 34 a + a = 36

Here's the answer, what's the question?

Differentiation and Depth

- A pupil really understands a mathematical concept, idea or technique if he/ she can:
- Describe it in their own words;
- Represent it in a variety of ways. (see examples)
- Explain it to someone else;
- Make up their own examples.
- See connections between it and other facts/ ideas.
- Recognise the calculation in a different format. (see example)

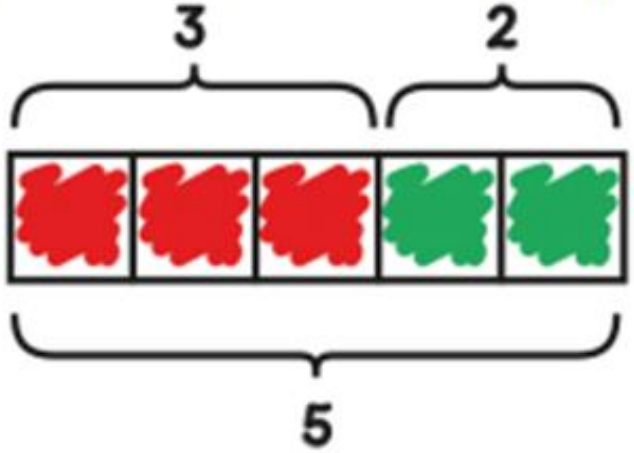
Concrete, Pictorial and Abstract



Concrete step of CPA

Concrete is the "doing" stage. This stage brings concepts to life by allowing children to experience and handle physical (concrete) objects.

For example, if a problem involves adding pieces of fruit, children can first handle actual fruit.



Pictorial step of CPA

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.

$$3 + 2 = \boxed{5}$$

Abstract step of CPA

Abstract is the "symbolic" stage.

Children use abstract symbols to model problems and need a solid understanding of the concrete and pictorial stages of the problem.

Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (+

Concrete, Pictorial and Abstract

16

A shopkeeper has **20** fish and **5** fish bowls.

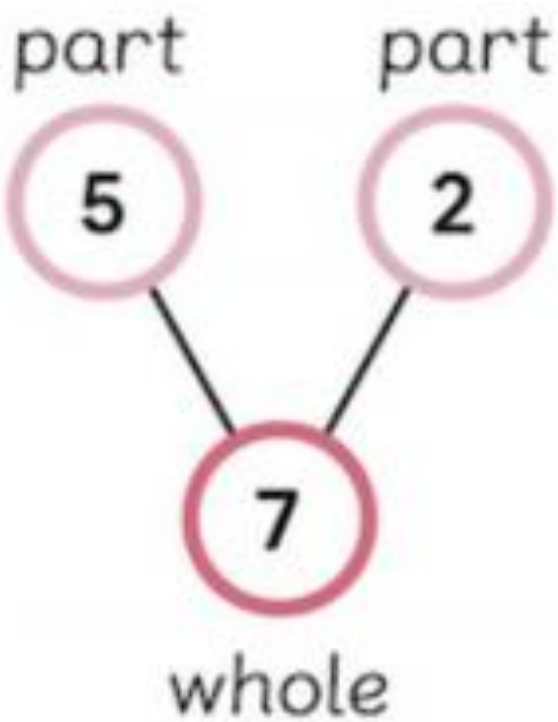
He puts the same number of fish in each bowl.

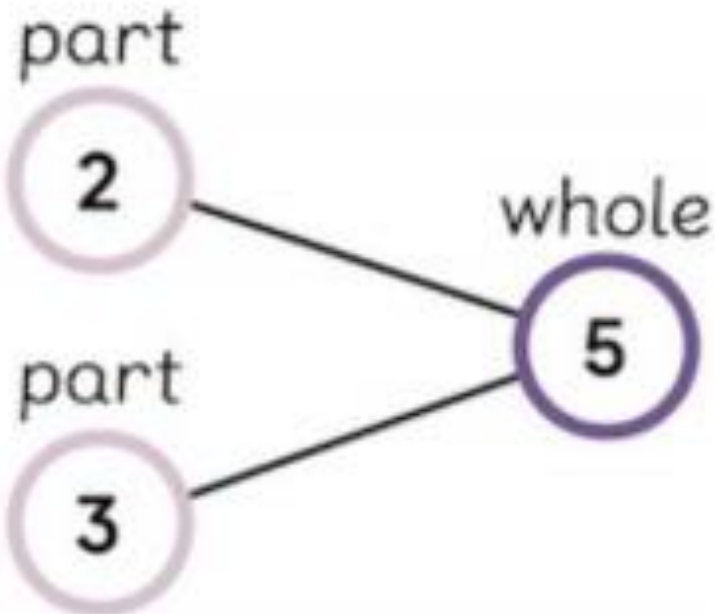
How many fish go in each bowl?

Number Bonds

Number bonds show how numbers are split or combined.

An essential strategy of Singapore maths, number bonds reflect the 'part-part-whole' relationship of numbers.





Number bonds are represented by circles connected by lines.

The '**whole**' is written in the first circle, while the '**parts**' are in the adjoining circles.

Bar modelling

Bar modelling is an essential maths mastery strategy.

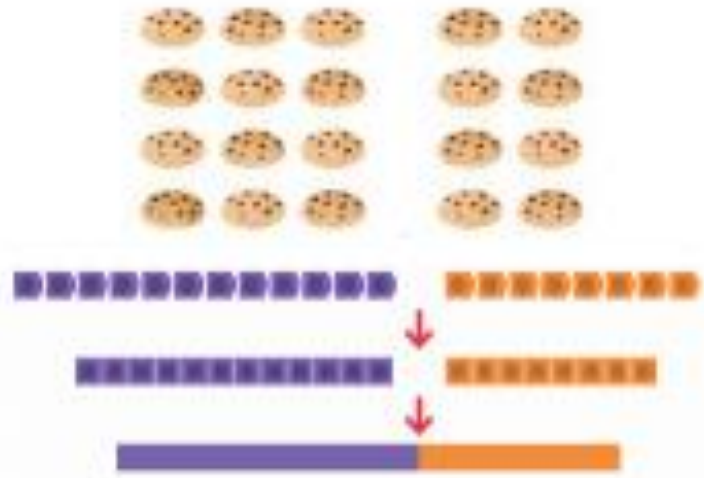
A Singapore-style of maths model, bar modelling allows pupils to draw and visualize mathematical concepts to solve problems.

Sam bakes 20 cookies.
What if he gives some away?

What if Sam gives away 8 cookies?

20 − 8 =

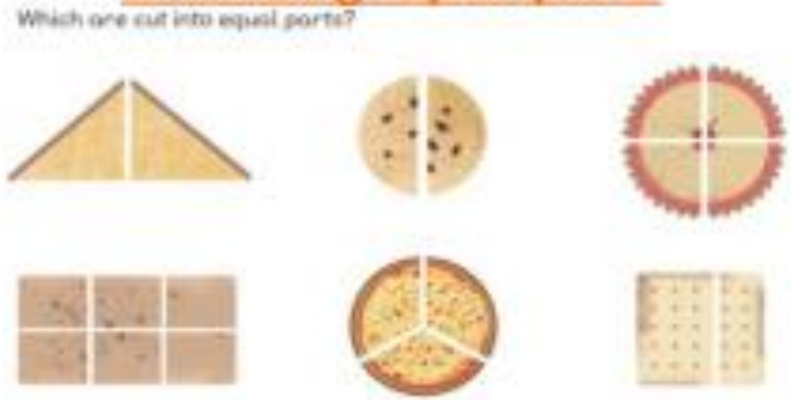
Then, Sam would have cookies left.



Fractions

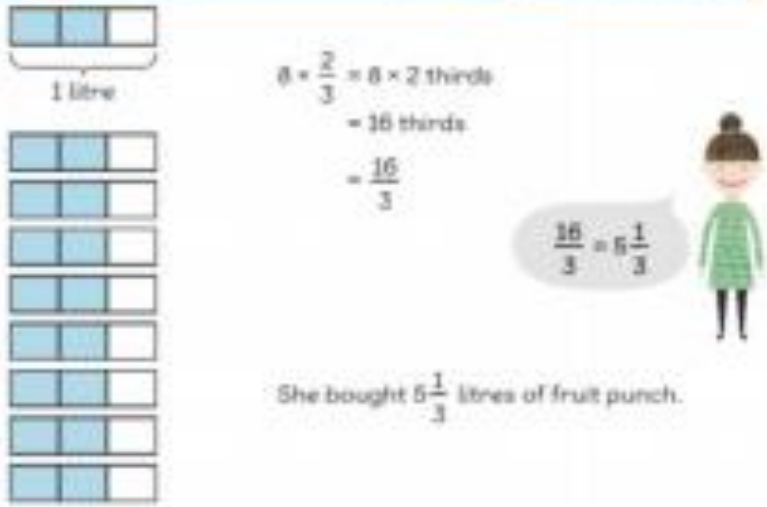
In Singapore, the understanding of fractions is rooted in the (CPA) model, where children use paper squares and strips to learn the link between the concrete and the abstract.

1. Finding equal parts

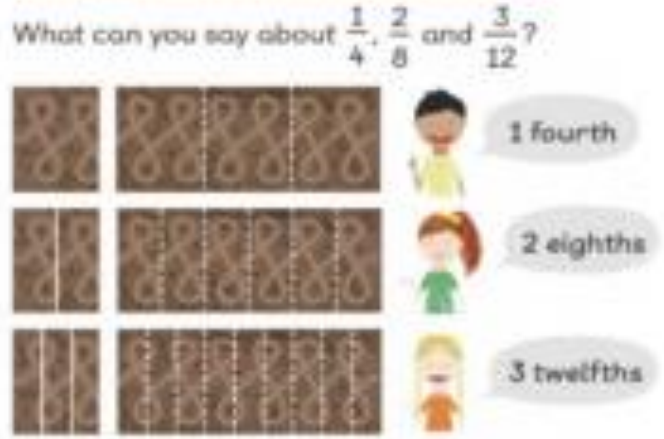


2. Naming equal parts

3. Operations involving fractions



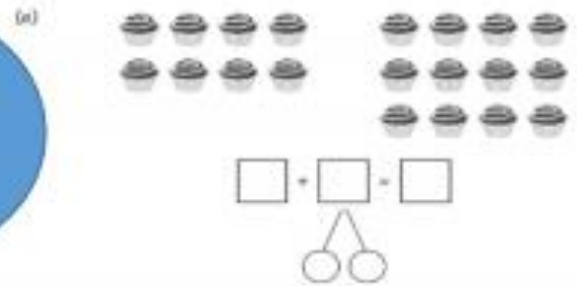
4. Equivalent fractions



Variation

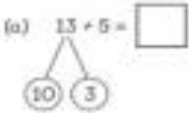
The questions and examples are carefully varied by expert authors to encourage pupils to think about the maths. Rather than provide mechanical repetition, the examples are designed to deepen pupils' understanding and reveal misconceptions.

Year 1



2 Add.

(a) 13 + 5 = □



(b) 8 + 11 = □

(c) 2 + 15 = □

3 Add.

(a) 14 + 3 = □ (b) 11 + 5 = □

(c) 4 + 16 = □ (d) 7 + 12 = □

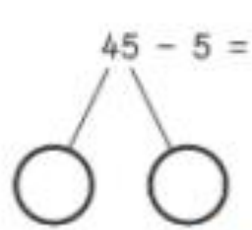
1 Subtract by counting back.

(a) 19 − 3 = □

11	12	13	14	15	16	17	18	19

5 from 45.

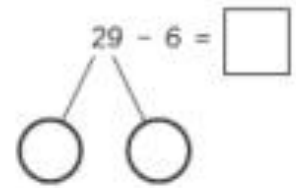
45 − 5 = □



Year 2

(a) 6 from 29.

29 − 6 = □



	tens	ones
	4	7
−		4

(b)

	tens	ones
	2	6
−		3

Multiplication tables check

- From the 2019/20 academic year onwards , schools in England will be required to administer an online multiplication tables check (MTC) to year 4 pupils.
- The national curriculum specifies that pupils should be taught to recall the multiplication tables up to and including 12 × 12 by the end of year 4.
- The purpose of the MTC is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It will help schools to identify pupils who have not yet mastered their times tables, so that additional support can be provided.

TIMES TABLES ROCKSTARS

'Sound check' is great practise for the multiplication tables check.

How to support at home

- Maths homework is issued every Thursday and is due in by Tuesday; whilst we want you to get involved and support your child, we don't want you to do the homework *for* them.
- Use every opportunity to ask your child questions about what they are doing. This is a very helpful way to consolidate learning and check for understanding.
- Log in to Times Tables Rock Stars several times a week
- Create a positive view of mathematics – be mathematicians together
- *See handout for suggestions*

Children at Work

- Two sessions will be held at each table, demonstrating mastery skills taught in each year group.

- Both sessions are the same content. Please feel free to observe a variety of classes.