



Mathematics

Reception Workshop

Polly Calvert – Early Years Leader
Jemma Clark – Reception Teacher and Early
Years Maths Lead



Objectives of the workshop

- Explain Maths Mastery
- Explain Maths in the Early Years at Fox
- Increase confidence and understanding in supporting your child



‘Mastery’

Where has it come from?

- East and south-east Asian countries such as Singapore, Japan, South Korea and China were massively out-performing the UK in maths.
- By age 15, students from these countries are on average up to three years ahead in maths compared to 15 year olds in England.
- What underpins this success is the far higher proportion of pupils reaching a high standard and the relatively small gaps in attainment between pupils in comparison to England.

Mathematics Mastery

Key principles

Problem
solving

High
expectations

Concrete,
pictorial, abstract

Depth
before breadth

Growth
mindset

Mathematical
language

- Lessons and resources used foster **deep** conceptual understanding
- Slowing down, overlearning

Fixed vs Growth mindset

Carol Dweck

*We believe that **everyone** can get better at maths...when they put in the **effort** and work at it.*

- Do not praise children for being clever when they succeed at something, but instead should praise them for working hard.
- Children learn to associate achievement with effort (which is something they can influence themselves – by working hard!), not ‘cleverness’ (a trait perceived as absolute and that they cannot change).
- Celebrate mistakes!



Examples of depth

- Can you count backwards from 14?
- What numbers are hidden inside 5?
- Can you give me 9?
- What numbers are inside 100?
- What is $4 + 2$? How do you know? Show me in another way. Prove it.
- Can you explain to your partner?

Mathematics in EYFS

Consists of 2 sections

- Number
- Shape, Space and Measure (SSM)





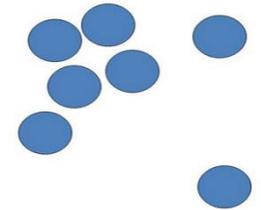
Number: Early Learning Goal

“Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.”

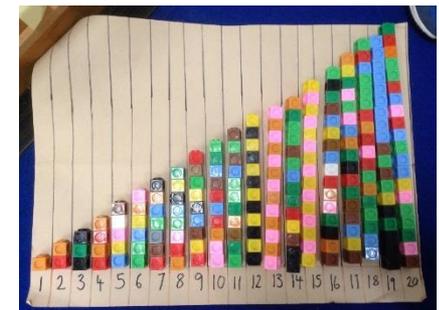




Foundations of number



- *It takes years to learn to **count!***
- *1:1 correspondence*
- ***Cardinality** (anything can be counted, understanding that the last number makes the total),*
- ***Composition** – what are numbers made up of?*
- ***Comparing** (language more/fewer, greater/less, the same)*
- ***Number sequence** – staircase image*
- ***Subitising** (instantaneously recognising the number of objects in a small group without counting)*





Speaking and listening

- Talk task
- Vocabulary – star words
- Questioning
- Full sentences
- My turn your turn
- Reasoning and explanation
- Problem solving



I am going to put four cubes on the frame. One, two, three, four: there are four cubes altogether.

I am going to put the four cubes in a different arrangement.



One, two, three, four: there are four cubes altogether.

How do you know?
Can you show me?
Prove it to me...
Can you show me in a different way?



Key vocab – many options!

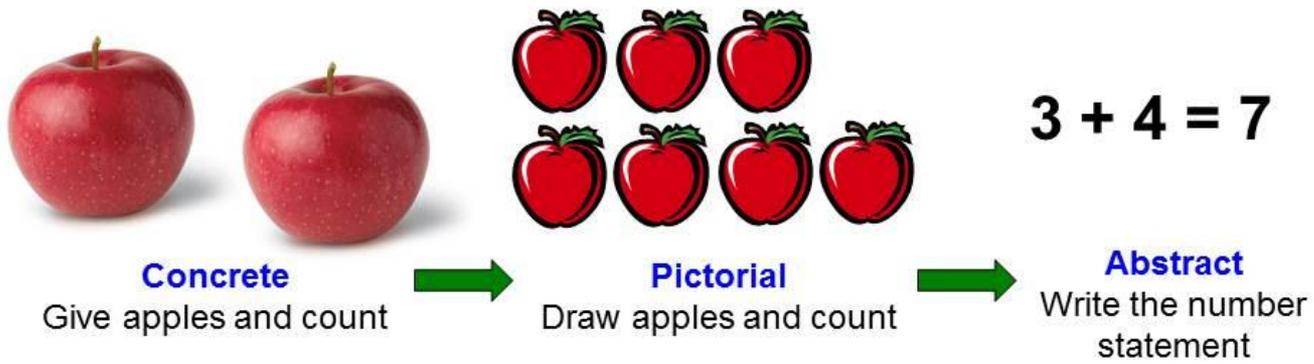
- how many?
- **more/ fewer**
- **greater/ less**
- order
- altogether
- left
- same/different
- equal
- is equal to
- equation
- count on/count back
- minus, subtract, take away
- add, addition, plus



CPA Approach	
Stage	Characteristics
Concrete	Refers to the use of manipulatives, measuring tools or objects that the student handles.
Pictorial	Refers to the use of drawings, diagrams, charts or graphs that the student draws
Abstract	Refers to abstract representations such as numbers and letters that the student writes

Example:

Tom had 3 apples. His mother gave him 4 more apples. How many apples did he have altogether?



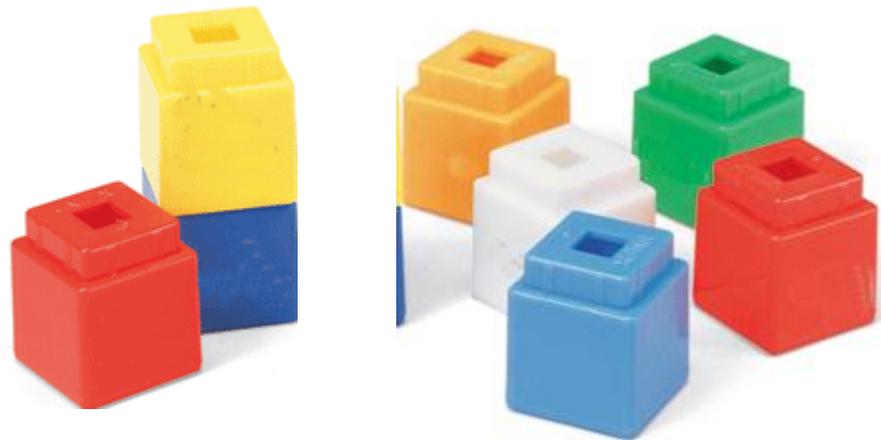
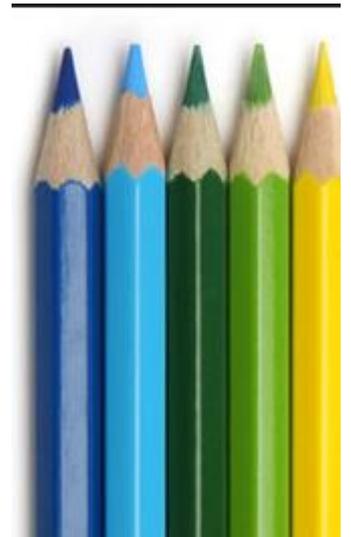
CONCRETE

PICTORIAL

ABSTRACT

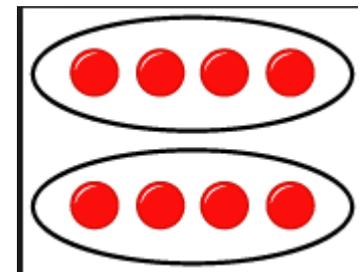
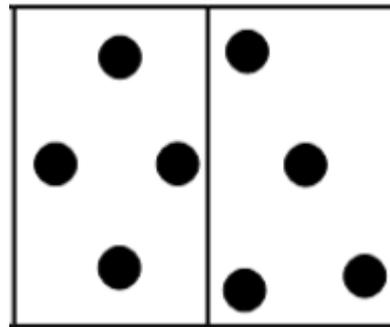
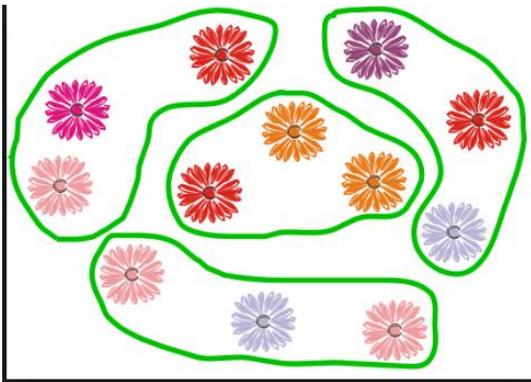
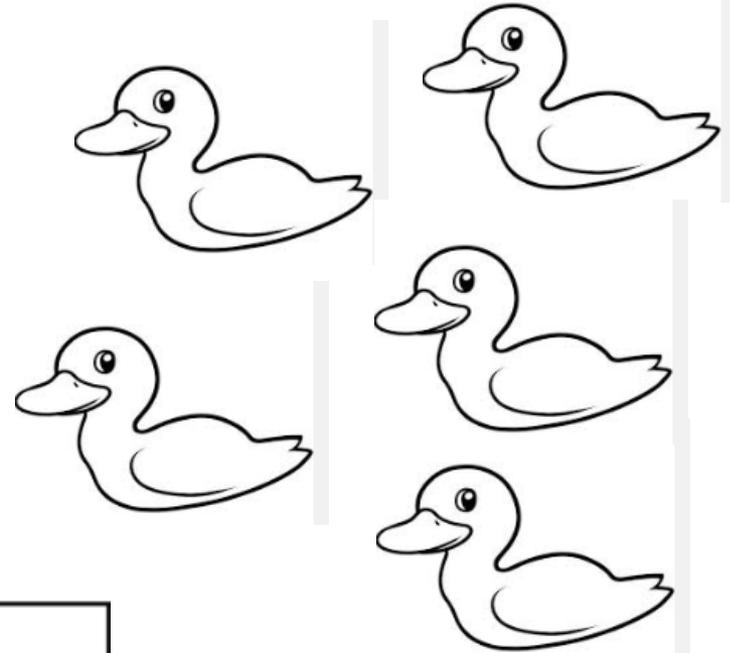
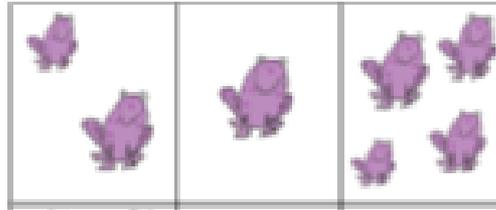
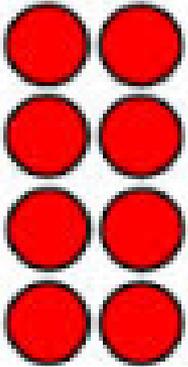
Draw on whiteboard

Concrete





Pictorial



Abstract

1	2	3	4	5
---	---	---	---	---



$$10 = 5 + 5$$



$$10 - 7 = 3$$

$4 + 7 =$

$$1 + 1 + 1 = 3$$

$$y = 2x^2 + 3x - 1 + xy$$

$$y - xy = 2x^2 + 3x - 1$$

$$(1 - x)y = 2x^2 + 3x - 1$$

$$y = \frac{2x^2 + 3x - 1}{1 - x}$$

Number cards	1 ● one
2 ●● two	3 ●●● three
4 ●●●● four	5 ●●●●● five



Conservation of number

- <https://www.youtube.com/watch?v=gnArvcWaH6I>

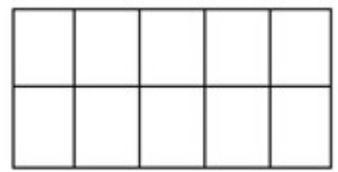


I am going to put four cubes on the frame. One, two, three, four: there are four cubes altogether.

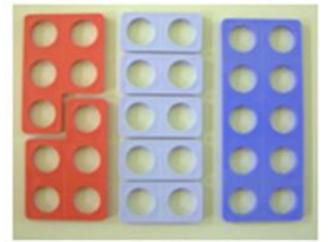
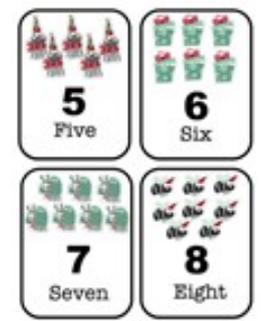
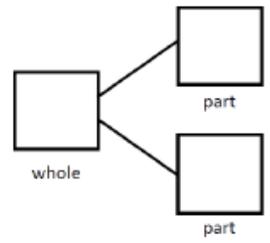
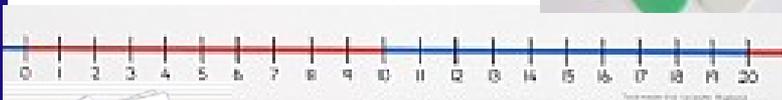
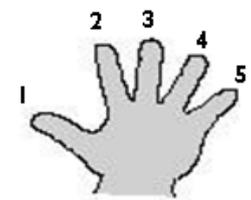
I am going to put the four cubes in a different arrangement.
One, two, three, four: there are four cubes altogether.



Resources we use at school



Using fingers to represent 1's, 2's etc.





Shape, Space and Measures: Early Learning Goal

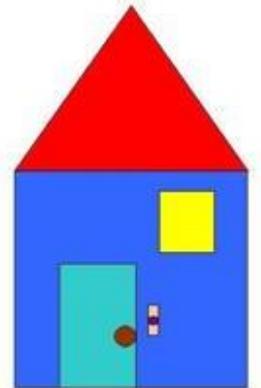
“Children use everyday language to talk about **size, weight, capacity, position, distance, time and money** to compare quantities and objects and to solve problems. They recognise, create and describe **patterns**. They explore characteristics of everyday objects and **shapes** and use mathematical language to describe them.”



Progression of skills in Maths Mastery

Key learning which is developed throughout the year:

- recognise, create and describe patterns
- explore characteristics of everyday objects and shapes and use mathematical language to describe them
- use everyday language to talk about size, weight, capacity and time
- estimate, measure, weigh and compare and order objects
- **All focused on practical, hands-on activities**



Concepts and mathematical vocabulary

Shape, Space and Measure

- **Positional Language**

- On top of
- In between
- In front of
- Behind
- Next to / alongside
- Along
- Over
- Under
- Through

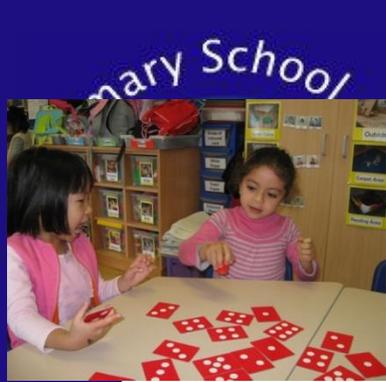


- **Language**

- Weight (heavy / light)
- Capacity (full / empty)
- Length and height (tall / short ; long / short)
- Time (before/next/after, morning/evening/night time, long ago/recently)
- Distance – far away/close/nearby

Shape language:

- 2d shapes
- corner/ vertex/ vertices
- Sides
- Straight/ curved
- 3d shapes
- Face
- Vertex/ vertices
- edges



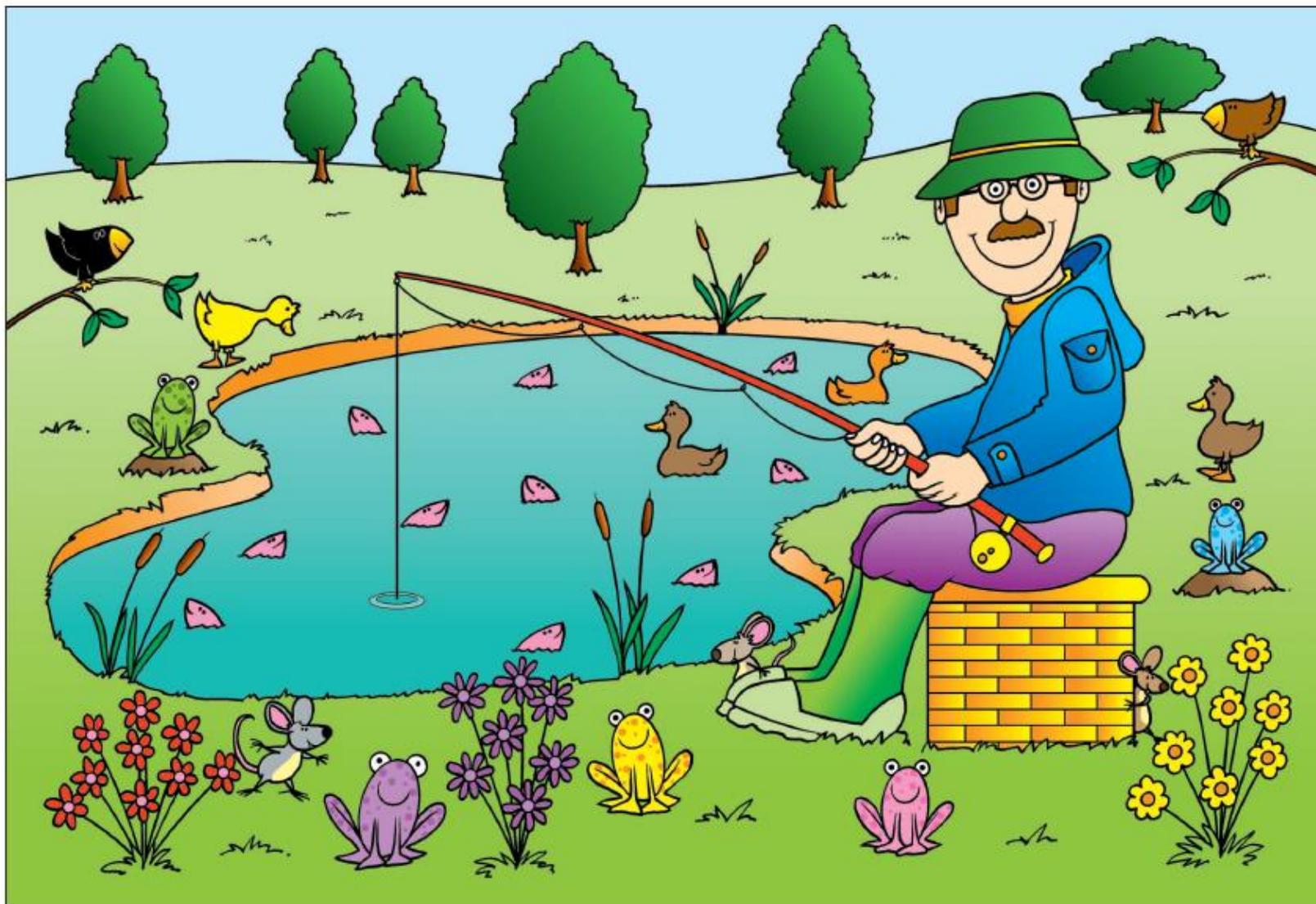
What does a Mathematics lesson look like?

- 3 carpet sessions a week
- Lessons have song/picture as context
- Lesson structure:
 1. Do now
 2. New Learning
 3. Talk task
 4. Develop learning/ plenary



Children are repeating key vocab throughout.

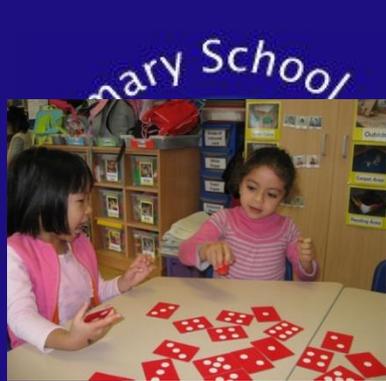
Big picture





Big picture





What does Mathematics look like in the classroom?

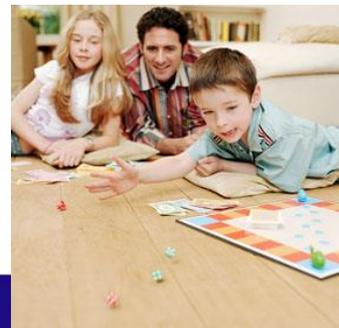
- Regular '**maths meetings**'
- One focused adult-led activity per week.
- Maths related activities always available indoors and outdoors
- Outside classroom has independent planned Maths activities
- Home learning once a week to support learning in class. Mainly practical and games based.

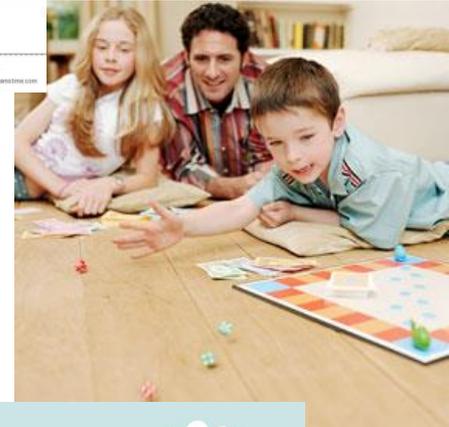




What can you do at home?

- Use everyday opportunities to count and recognise numerals
- Support the use of comparative language
- Play games
- Set challenges
- Talk about every day maths that you use and encourage your child to help you solve problems







Resources

- BEAM
- NRICH (problem solving tasks and games)

BBC EYFS <http://www.bbc.co.uk/schools/websites/eyfs/> - activities across all curricula areas (go to Maths section)

- Top Marks <http://www.topmarks.co.uk/maths-games/5-7-years/counting>
- Sparklebox and Twinkl – printable resources
- Number Jacks/ Number Blocks (Cbeebies)
- Maths seeds (app)
- Orchard Games



Questions?

