

SCITT Maths Training 1

- Early Number
- Number and Place Value

Start: 19-25 Harrison Rd, Fareham PO16 7EQ, UK
Head south on Harrison Rd towards Southampton Rd

0.1 Turn left at the 1st cross street onto Southampton Rd

0.3 At the roundabout, continue straight onto Wallington Way/A32
Go through 1 roundabout

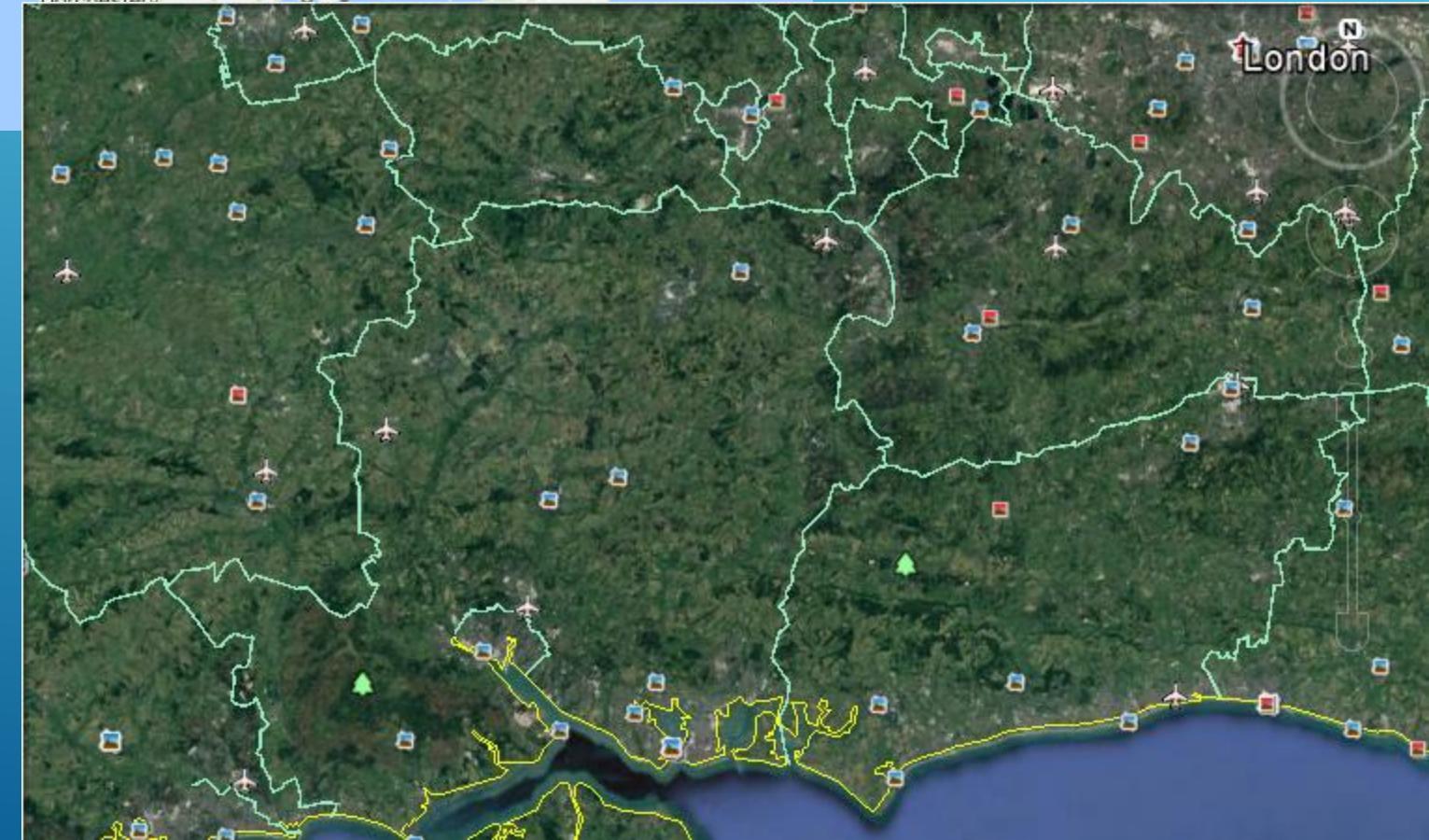
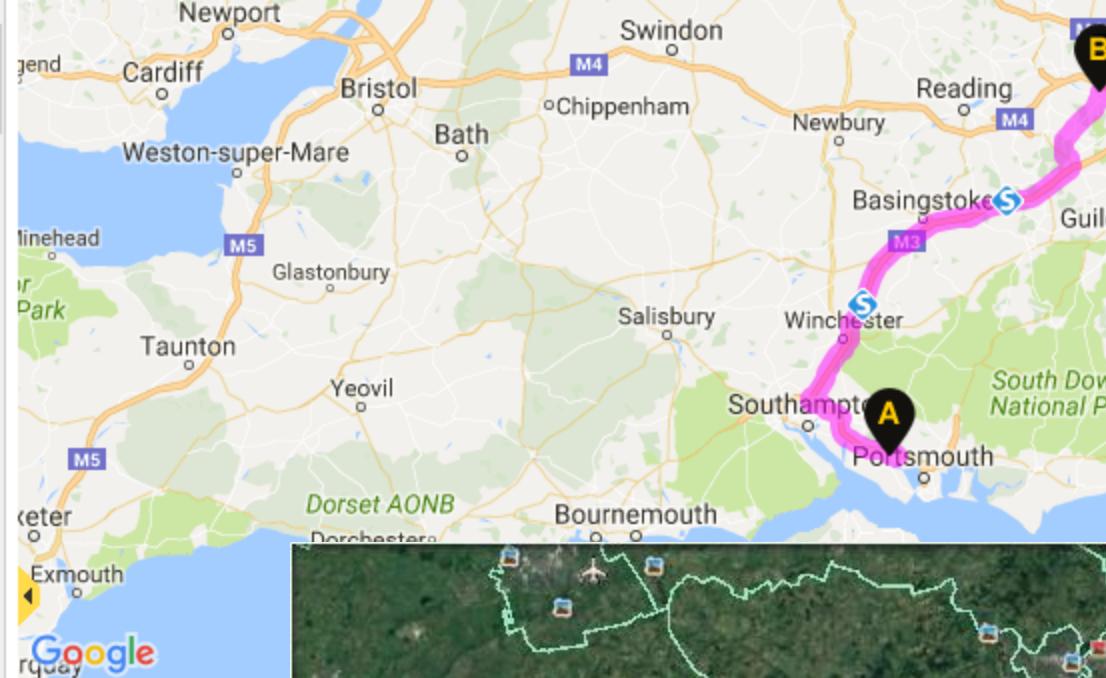
0.7 At the roundabout, take the 2nd exit onto the A27 slip road to M27/Southampton/Brighton/Portsmouth

(M27)
Portsmouth
Southampton

0.9 Keep right and merge onto A27

1.3 At the roundabout, take the 1st exit onto the M27 slip road to Alton/A32/Southampton

The journey...



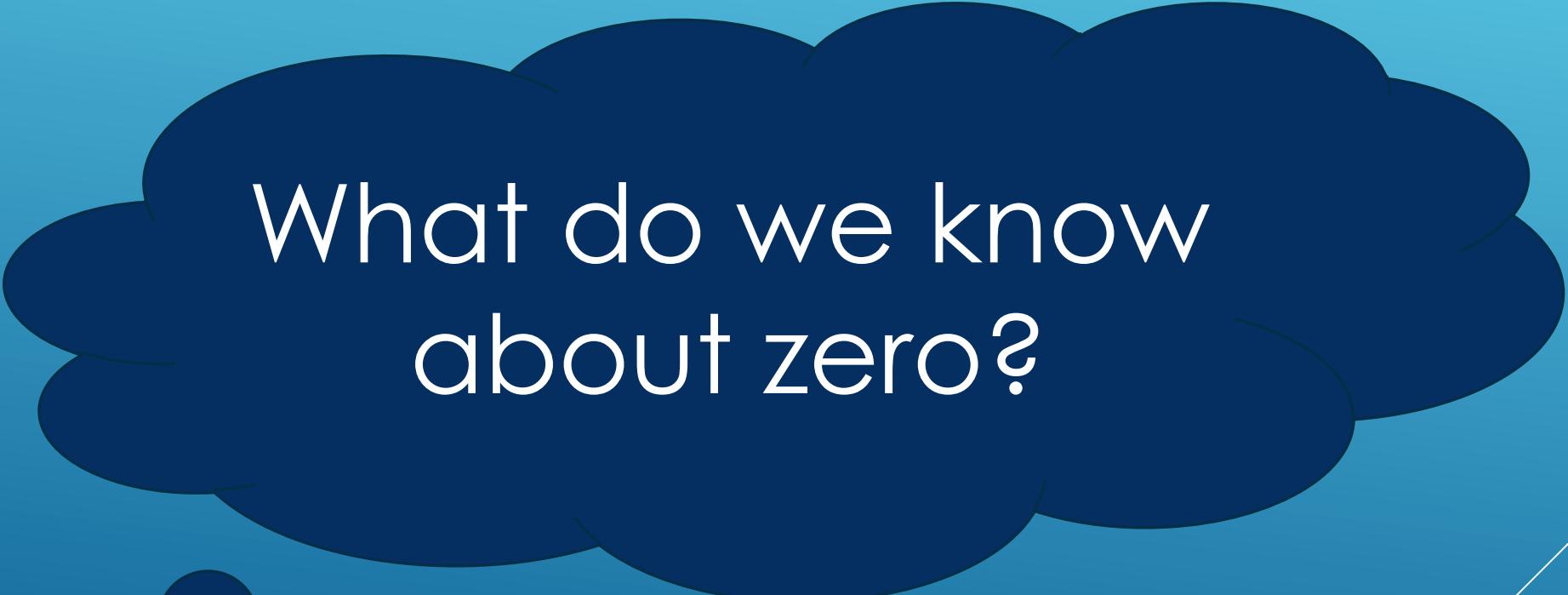
The emphasis on a problem solving approach could mean that the mathematical environment that we create, that our students of all levels experience, will help them to develop their own mathematical map and to see for themselves the links and connections. (NCETM)



WHERE OUR NUMBER SYSTEM CAME FROM

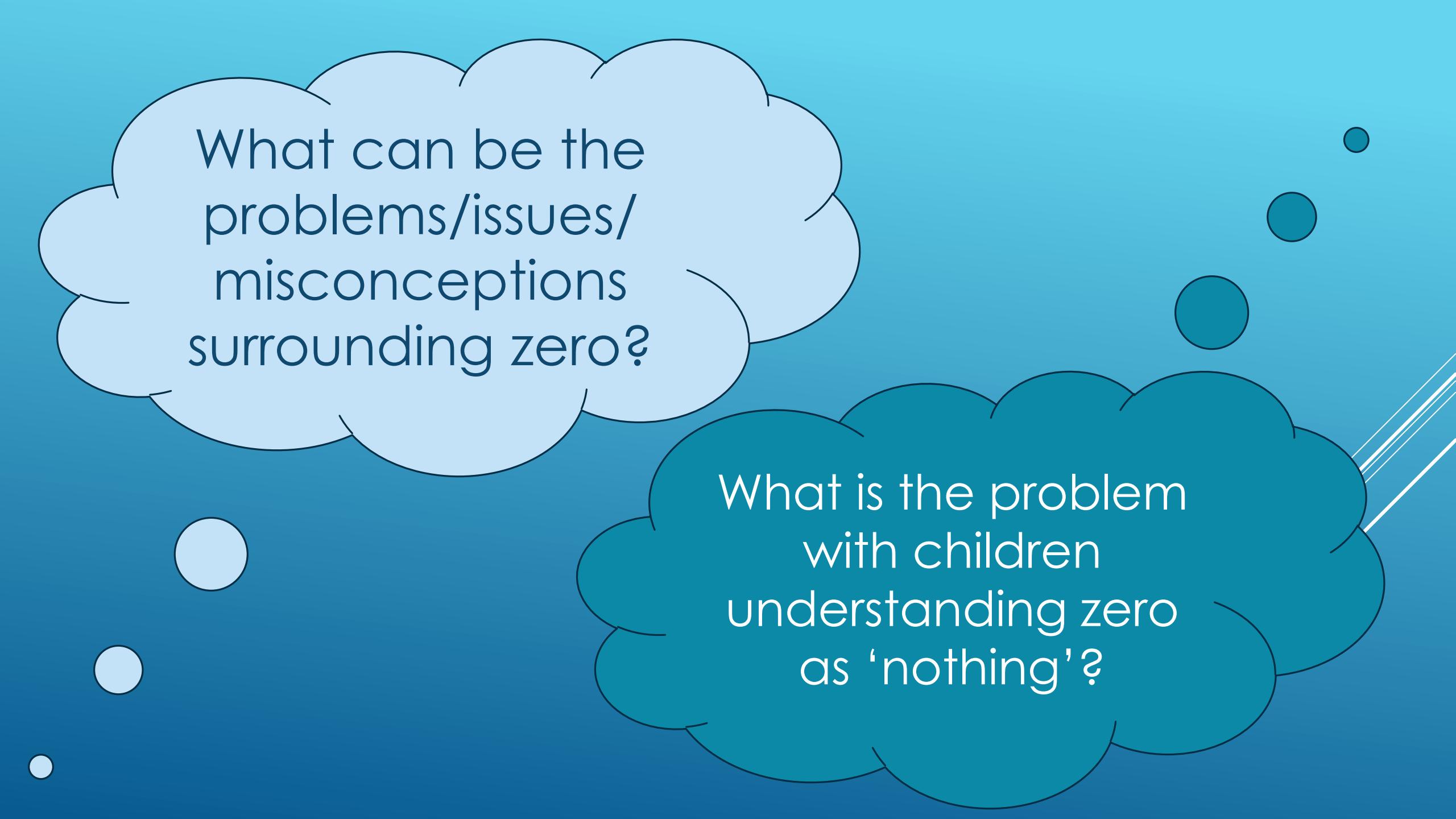
- ▶ The principle of place value is the basis of the Hindu-Arabic number system that enables us to represent all numbers by using just ten digits (0 1 2 3 4 5 6 7 8 9)
- ▶ Our decimal number system is known as a *positional* number system, because the value of the number depends on the position of the digits. For example, the number **123** has a very different value than the number **321**, although the same digits are used in both numbers.
- ▶ In a positional number system, the value of each digit is determined by which place it appears in the full number. The lowest place value is the rightmost position, and each successive position to the left has a higher place value.

ZERO IS A VERY SPECIAL NUMBER!



What do we know
about zero?





What can be the
problems/issues/
misconceptions
surrounding zero?

What is the problem
with children
understanding zero
as 'nothing'?

REINFORCING BASE 10 THROUGH A PROBLEM

The Deca Tree



The deca tree
has 10 trunks.

On each trunk
there are 10
branches.

On each branch
there are
10 twigs.

On each twig
there are
10 leaves.



One day a woodcutter came
along and cut down one
trunk from the tree.

Then he cut off one
branch from another
trunk of the tree.

He then cut off one
twig from another branch.

Finally he pulled one leaf
from another twig.

**How many leaves were left
on the tree?**

Mathematical vocabulary

Possible misconceptions

Assessment opportunities

Workings and solution

Useful concrete resources (and how they could be used)

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How many leaves were left on the tree?

How to support and extend this challenge

Every year, there is a significant number of children entering Year R being able to count to 20, 30 and beyond, but they have little or no understanding of the numbers or the number system. They are just reciting the numbers as if they are a nursery rhyme.

EYFS Leader

Keep in mind:

performance ≠ learning

Correct responses in a lesson don't indicate how much forgetting might take place, or how much **learning** has, or has not, taken place.



Using the Hampshire Assessment Videos as a Benchmark

Primary Mathematics Assessment Video Clips

5	STJR adapted	Addition/subtraction	Close to	Y4 NCETM task	<ul style="list-style-type: none">Formal subtraction method not secureUses formal methods every time unless prompted by adult	<ul style="list-style-type: none">Rounding numbers when part of a calculationDiscussing reasoning when deciding whether to work mentally or with formal written methodsCheck formal subtraction methods can be modelled using concrete resources for PV exchangeCheck can talk through subtraction formal method using appropriate PV vocabularyCheck understands why and uses inverse to check calculations
5	STJK	Addition/subtraction	Securely on track	Y4 NCETM task	<ul style="list-style-type: none">Can discuss whether mental or written method good choiceCan use formal methods for large numbers	<ul style="list-style-type: none">Rounding 4 and 5 digit numbersMulti step problem solving in which some parts calculated mentally and some with formal methodsCheck formal methods can be modelled using concrete resources for PV exchangeCheck can talk through subtraction formal method using appropriate PV vocabulary
5	LM	Multiplication/division	Securely on track	Y5 NCETM task	<ul style="list-style-type: none">Able to discuss numbers in division calculation number sentence in terms of divisor, quotient and remainder	<ul style="list-style-type: none">Teach and use vocabulary: divisor, quotient and remainder in the context of problem solvingMissing box equations involving more than one operation related to problem solving
5	OW	Multiplication/division	Below	Y5 NCETM task	<ul style="list-style-type: none">Adult support to work out problem	<ul style="list-style-type: none">TU x U fluency linked to related division factsProblem solving using division including remainders
5	STJE	Multiplication/	Beyond	Y4 NCETM task	<ul style="list-style-type: none">Can discuss whether mental	<ul style="list-style-type: none">Writing numbers correctly

USING THE HAMPSHIRE ASSESSMENT VIDEOS AS A BENCHMARK

<https://www.youtube.com/playlist?list=PL7DOTBDE9iwesAIEF9kl9iCxUfoNh3a2b>

**What did Mollie
show she is secure
in?**

Mollie was assessed and
moderated as working at ARE in Y2

What are her next steps?

The dangers of making assumptions...

What misconception(s) may Mollie have?

How could these be explored further?

UNDERSTANDING TYPES OF NUMBER

Numerals:

Nominal aspect:

Ordinal aspect:

Cardinal aspect:

PRINCIPLES BEHIND LEARNING TO COUNT

Quantification: the formal name for the concept of figuring out how many things you've got. Counting is just one method of quantification.

There are 3 developmental stages a child goes through when learning to quantify:

3. Counting

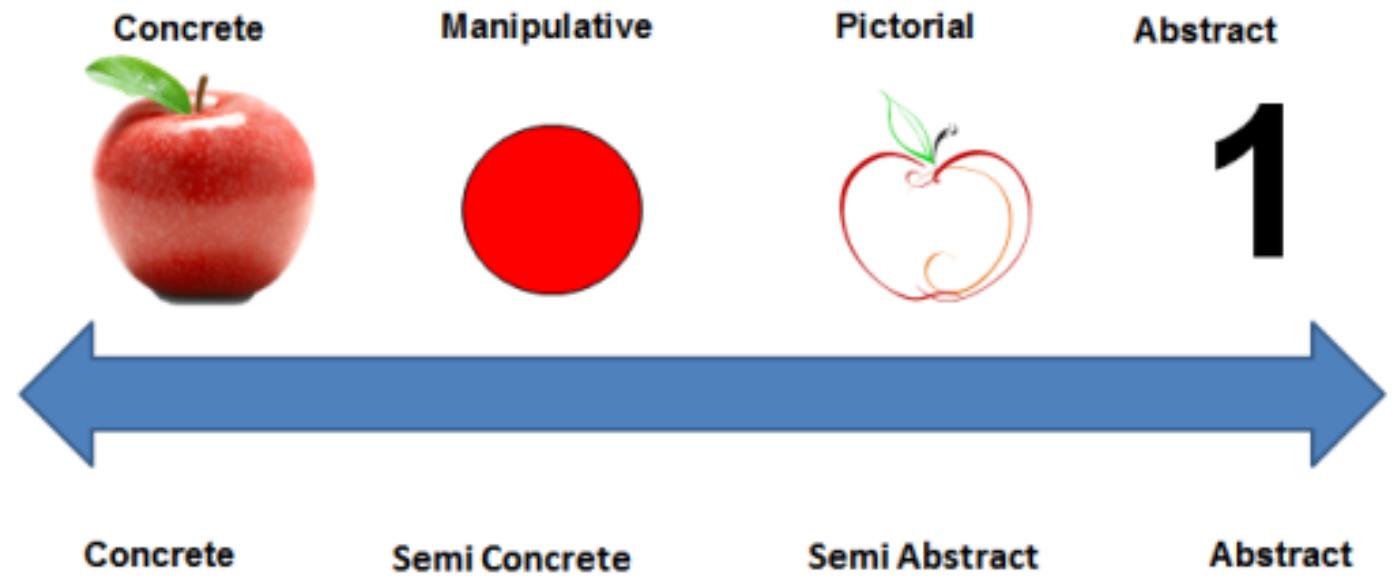
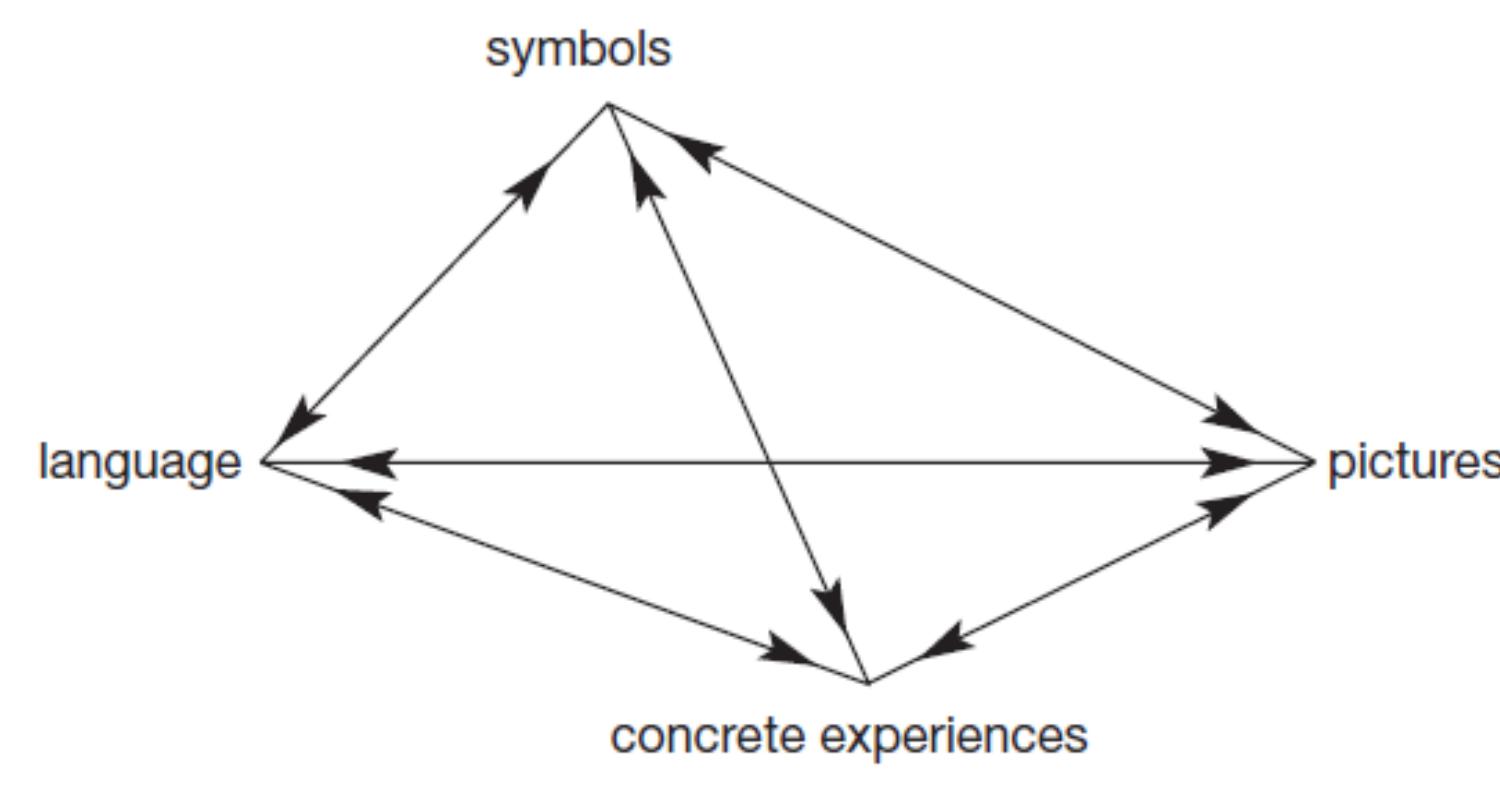
2. One-to-one correspondence

1. Global Quantification

CONSERVATION OF NUMBER

Conservation is the understanding that something stays the same in quantity even though its appearance changes.

How can we develop and assess whether a child has cardinality?



CONCRETE RESOURCES TO SUPPORT MATHEMATICS

Which concrete resources are available to us in school to support the understanding of place value?

What are the benefits and possible concerns
of using concrete manipulatives in maths?

POST-SESSION TASK

- ▶ Please bring a paper copy of the **Calculation Progression Policy** from your current school.
- ▶ Next session: 17th December 2019