

# EYFS appropriate pedagogy

## ECMG Early Years mathematics pedagogy (May 2019)

“Early mathematical understanding is achieved during both child initiated play and adult teaching through meaningful contexts, so that all children have daily moments where they explicitly engage with mathematic concepts and language”

“being playful with mathematical idea – making deliberate mistakes”

“a repertoire of mathematical language and representations including personalised recording”

# What does that mean for early years practitioners?

Spend longer on key subject areas in mathematics

If a child fails to grasp something, interventions are put in place quickly to help close the gap

Mixture of whole class teaching, adult scaffolded activities and continuous provision

Maths is fun! Play based and informal initially before moving on to more formal methods in KS1

CPA Approach

Systematic approach to apparatus and resource use

# EYFS appropriate pedagogy

- **Do it**

Practical activities, a large variety of language, use of manipulatives, working in different sized groups, exposure to visual representations

- **Twist it**

Common EYFS practice, growth mindset learning from mistakes, justifying and using language

- **Solve it**

Display the skills independently, teach it one another, apply it to other situations

- **No ability groups**

2 groups a day, 1 day for scoop groups, pushing children further (solve it's), targeted interventions

- **MOT** (10-15 minutes)

Practical activities, regular conversations, re-enforcement of language, songs, love of maths

# Curriculum design

## Mastery Approach

### Do it, Twist it, Solve it

- “Do it is where you do it all”
- “I’m getting better at hardest maths, I get onto the solve it and have to work it out on my own”
- “Billy get’s things wrong so we help him get the right answer” (twist it)
- “Do it is easy, twist it is when the teachers try to trick us and the solve it is where you have to figure it out on your own”

# Small steps of learning

“A well organised conceptual framework of number information that enables a person to understand numbers and number relationships and to solve mathematical problems” (Bobis, 1996)

“Developing a strong grounding in number is essential for providing children with the platform to excel mathematically. Children should develop a deep conceptual understanding of the numbers to 10, the relationships between them and the patterns therein.” (DfE, 2018)

The National Council of Teachers (USA, 1989) identified 5 components that characterise number sense:

- Number meaning
- Number relationships
- Number magnitude
- Operations involving numbers and referent for numbers and quantities

13.3.2019  
Finding half

half is when you have 2 pieces of the same amount

Twist it - "half the circle is pink"  
What do you think?

"the pink is too much to be half"

Do it:

1	3	5	7	9
10	8	6	4	2
1	4	7	10	13

Twist it:

Billy bear has completed some number patterns too and found the missing number in red, what do you think?

2	4	6	8	10
7	6	5	4	3

← Opportunities for children  
To use mathematical language

# Deepening Learning

"those pupils who grasp concepts quickly are challenged with rich and sophisticated problems within the topic"

23<sup>rd</sup> May 2019

Which different numbers add up to make 10 and 20?

$$\boxed{11} + \boxed{9} = 20$$

$$\boxed{5} + \boxed{5} = 10$$

$$\boxed{14} + \boxed{6} = 20$$

$$\boxed{6} + \boxed{4} = 10$$

$$\boxed{12} + \boxed{8} = 20$$

$$\boxed{3} + \boxed{7} = 10$$

$$\boxed{8} + \boxed{12} = 20$$

$$\boxed{4} + \boxed{6} = 10$$

$$1. \quad 2 + \boxed{11} = 13$$

$$2. \quad 4 + \boxed{6} = 10$$

$$4. \quad 3 + \boxed{12} = 15$$

$$5. \quad 8 + \boxed{9} = 17$$

# 6 main areas of EY maths

**Cardinality and Counting**: understanding that the cardinal value of a number refers to the quantity, or 'howmanyness' of things it represents

**Comparison**: understanding that comparing numbers involves knowing which numbers are worth more or less than each other

**Composition**: understanding that one number can be made up from (composed from) two or more smaller numbers

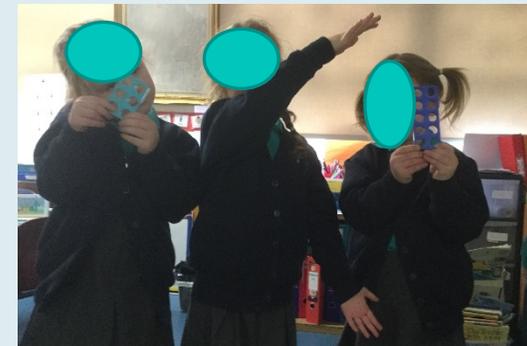
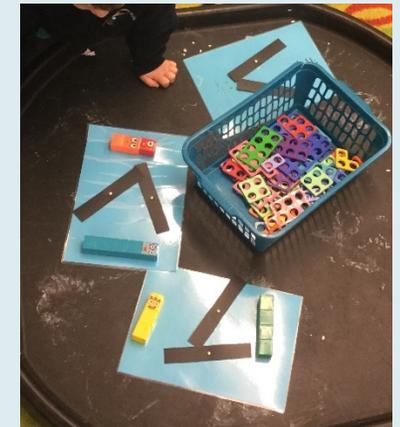
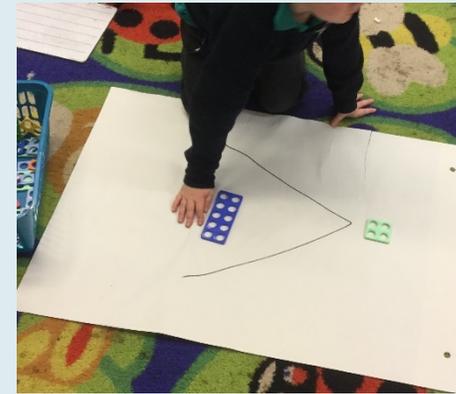
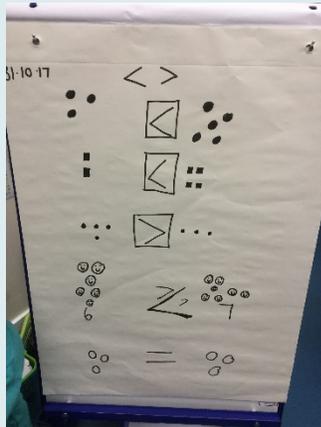
**Pattern**: looking for and finding patterns helps children notice and understand mathematical relationships

**Shape and Space**: understanding what happens when shapes move, or combine with other shapes, helps develop wider mathematical thinking

**Measures**: comparing different aspects such as length, weight and volume, as a preliminary to using units to compare later

# Comparison- More than/ less than

- Children need the opportunities to compare collections of things and then begin to discuss which group has more.
- Initially the groups need to be largely different with one group obviously having much more.



Numerosity of comparison- offer a challenge in providing lots of small things and fewer larger things. Focus in on the value of things not their size.

# Comparison: Who has more?



# Same value as

- Children can compare things and see that sometimes groups of things have the same value.



- Ask children to convert two unequal groups into two that have the same number, e.g. 'There are 6 apples in one bag and 2 in another bag; can we make the bags equal for the two hungry horses?'

## Value, Place Value & Equal Value

'I have a value of...'

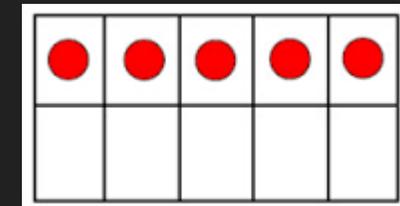
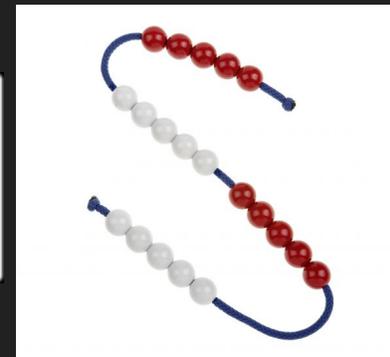
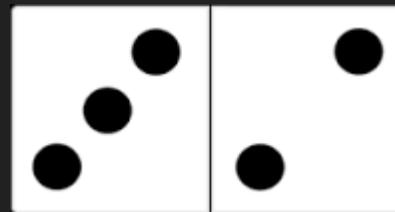
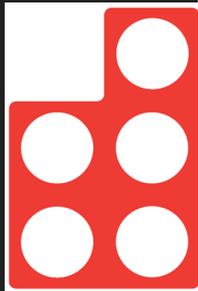
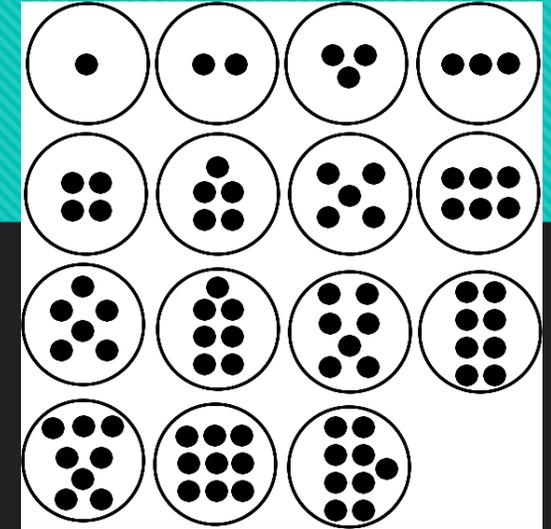
'This has a value of...'

'...is the same value as...'

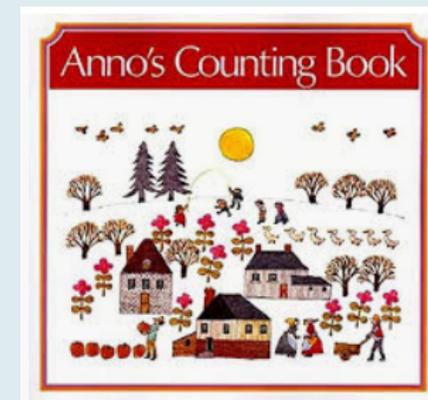
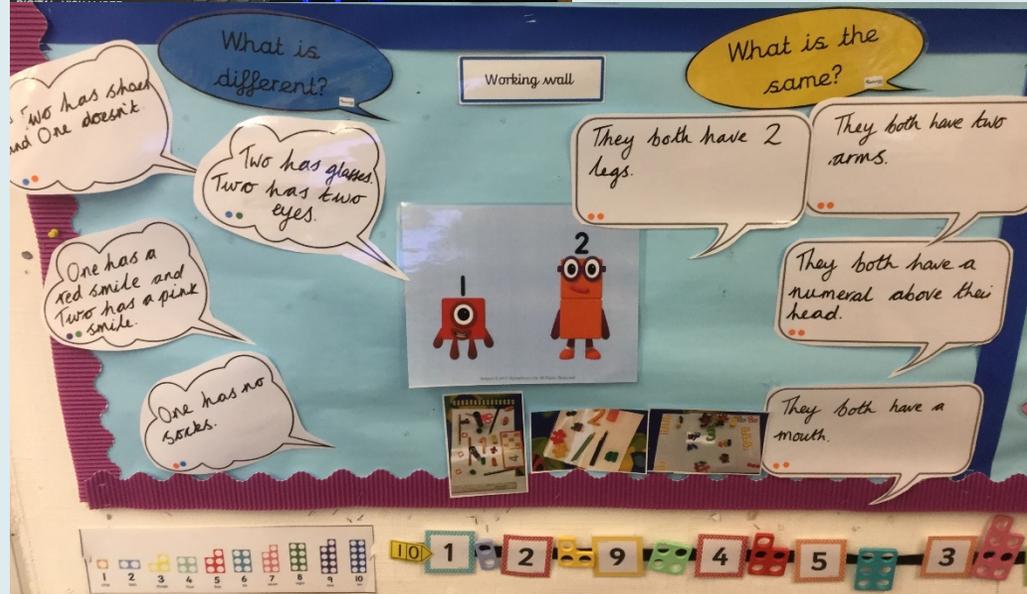
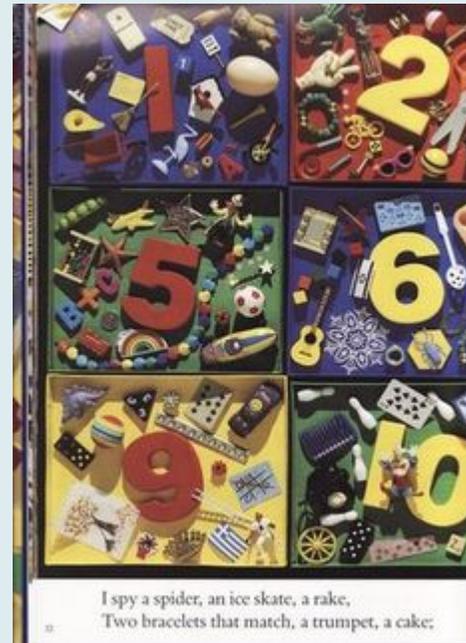
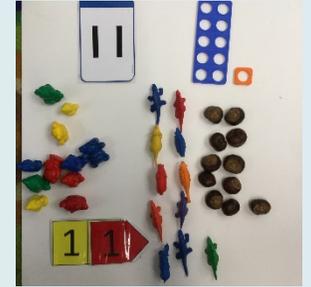
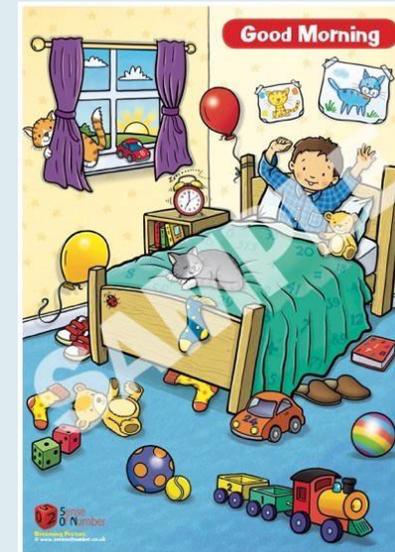
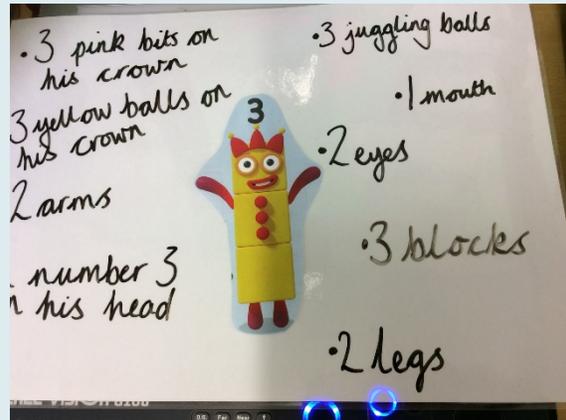
'...has the same value as...'

'Same value but looks different'

'Equal value to/equivalent to..'

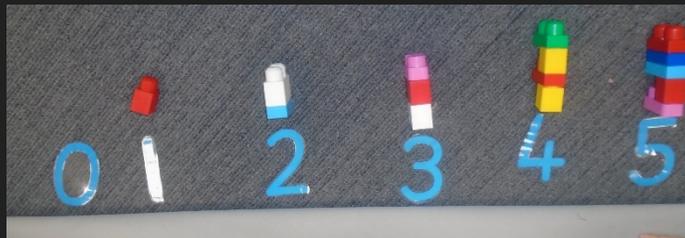


# Comparing Numbers and Reasoning

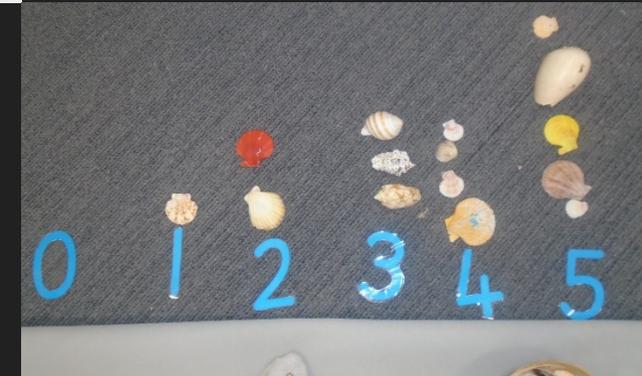


# Knowing the one more/ one less relationship between counting numbers

## ○ Staircases



## ○ Visualising numberlines



# Links to comparison

- Numicon, cubes and other manipulatives
- Estimation
- Voting
- Etc.



# Spotlight on Comparison

## Comparison

Comparing numbers involves knowing which numbers are worth more or less than each other. This depends both on understanding cardinal values of numbers and also knowing that the later counting numbers are worth more (because the next number is always one more). This understanding underpins the mental number line which children will develop later, which represents the relative value of numbers, i.e. how much bigger or smaller they are than each other.

	Examples of Activities and Opportunities	Focused Teaching (Please record the focused teaching activities/contexts you used to develop the learning)
<b>More than / less than</b> Children need progressive experiences where they can compare collections and begin to talk about which group has more things. Initially, the groups need to be very obviously different, with one group having a widely different number of things. Collections should also offer challenges, such as including more small things and fewer large things, to draw attention to the numerosity of the comparison, i.e. the number of things, not the size of them.	<ul style="list-style-type: none"><li>collections for children to sort and compare, which include objects which are identical, and which include objects of different kinds or sizes</li><li>collections with a large number of things, and collections with a small number of things.</li></ul>	

**Reflection** (record your reflection on children's progress in this area, with consideration of your focus children)

More

Child comp

has n

obvio

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# Spotlight on Comparison - Progression

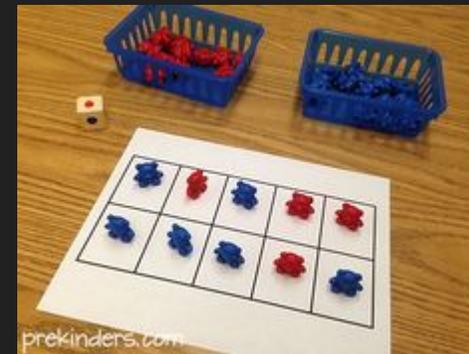
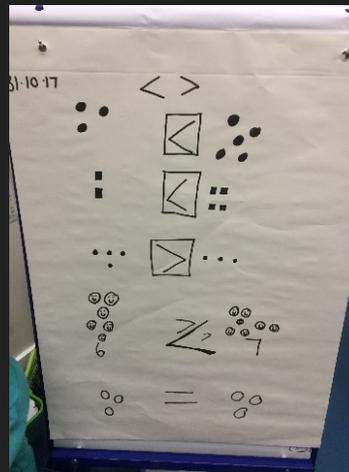
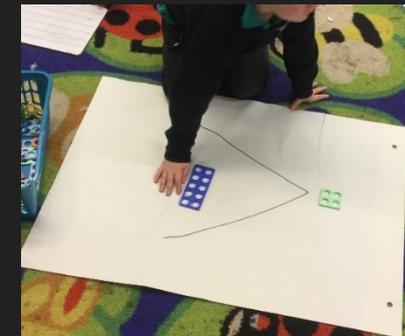
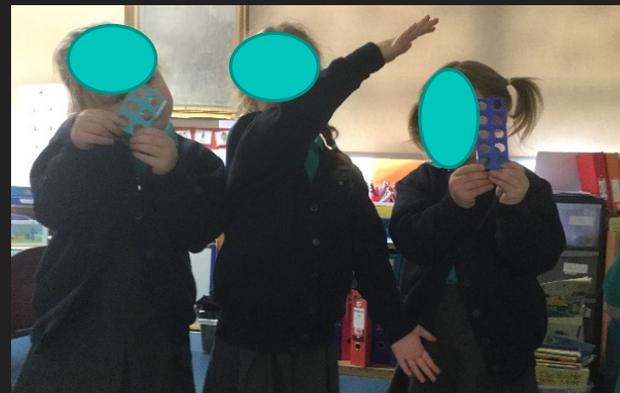
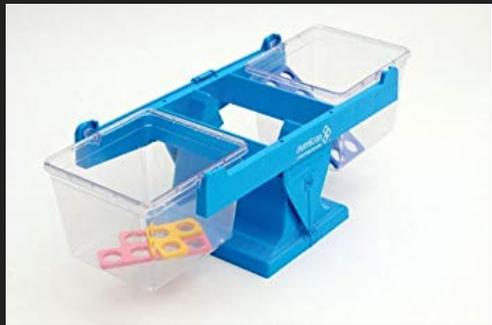
## More than / less than

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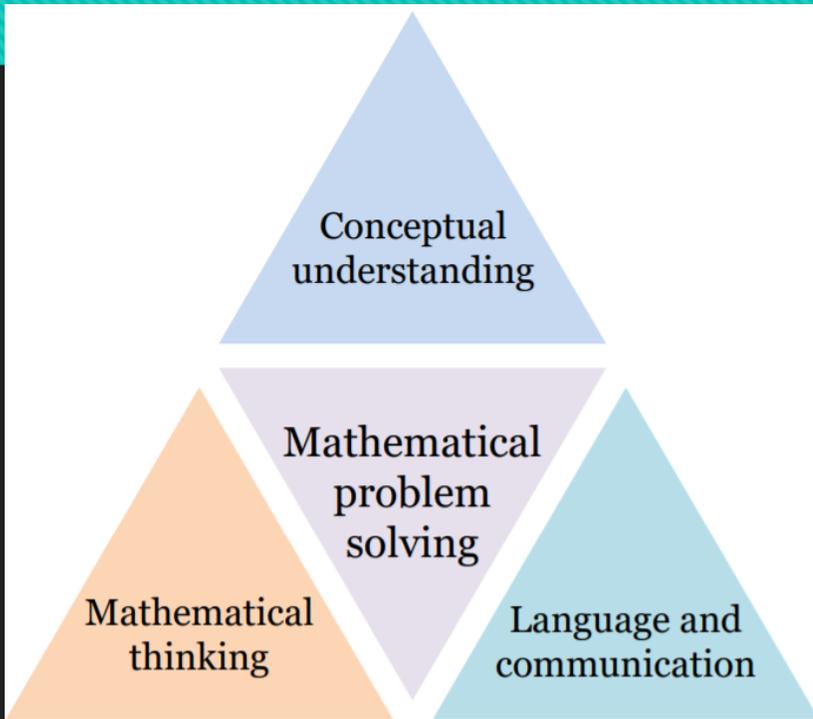
COUNTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
COMPARING NUMBERS					
use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1000 <i>compare numbers with the same number of decimal places up to two decimal places</i> (copied from Fractions)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)

# Spotlight on Comparison

## Comparison- More than/ less than



# Developing mathematical language



Dury, 2015

**Language and communication**  
Pupils deepen their understanding by explaining, creating problems, justifying and proving using mathematical language. This acts as a scaffold for their thinking and deepening their understanding further.

- Sharing the key vocabulary at the beginning of every lesson and insisting on its use throughout
- Expecting children to respond using a full sentence
- Modelling clear sentence structures using mathematical language.
- Purposeful Talk Task activities
- Opportunities for pupils to reason and explain (in sentences) the maths they are learning about.

# Developing mathematical language

## Stem sentences

This technique gives students the opportunity to respond in the form of a complete **sentence** to effectively communicate. **Sentence stems** provide scaffolding to help students get started in speaking or writing without the added pressure of thinking about how to correctly formulate a response.

Teachers provide a **sentence stem** for children to communicate their ideas with **mathematical** precision and clarity.

“There is an association between the quality and frequency of mathematical language used by carers, parents and teachers as they interact with young children, and childrens development in important aspects of mathematics” Dunphy et al (2014)

# Talking about early number



Two cubes  
and one more  
is what?

Two cubes  
and one more  
is ...

Two cubes and  
one more is  
three cubes.



Three.



Two cubes  
and one more  
is three.



Two cubes  
and one more  
is three cubes.

# Two

One less two is one.

One greater than two is three.

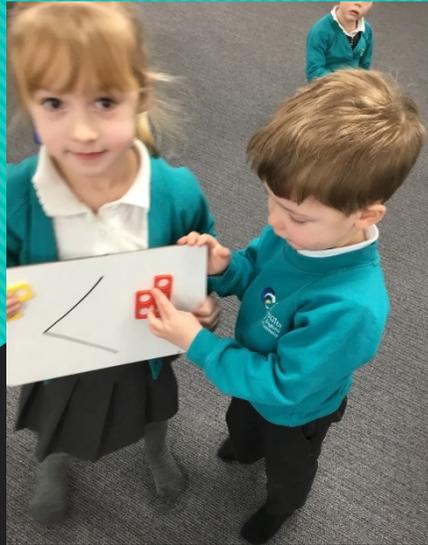
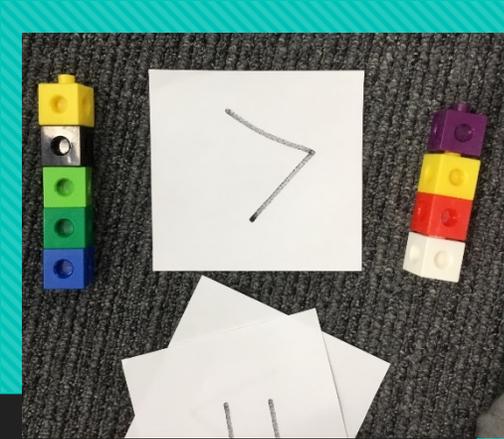
Two is one less than three and one greater than one.

One greater than two is three.



The number that is one less than three and one greater than one is two.

Three is one greater than two.



“Four is one more than Three, so, Three is one less than Four”

Practical activities inform use of STEM sentences

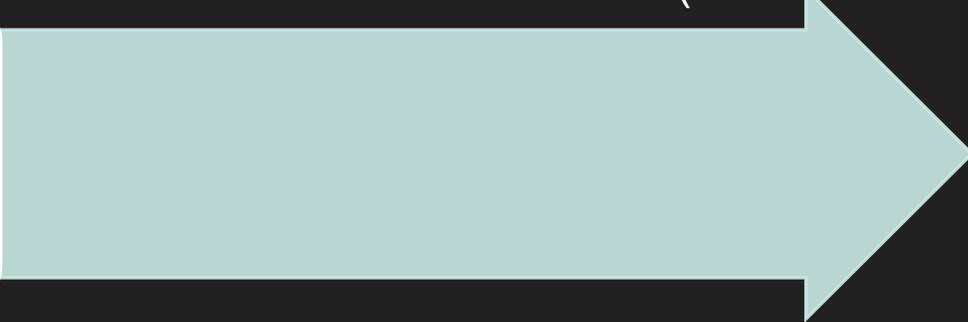


# Pedagogy focus – direct and focused teaching including planning

Many adults, including early educators, believe that sequenced, intentional instruction will harm children's play. These concerns are misplaced. *Math and literacy instruction increase the quality of young children's play.* Doing both makes each richer.

(Clements and Sarama 2017)

Discuss what you read before the session.



How does this relate to your practise/ practise you've seen?



# What to consider when planning?

What do I  
need to  
know?

What is the  
maths we  
are  
planning to  
teach?

What do  
we need to  
think about  
before we  
plan?

# What to consider when planning?

- Focus of the mathematics
- Questioning – What do we want them to notice?
  - Progression and sequencing
  - Development of language
- My own knowledge and understanding
- Consideration of prior learning – What do they already know?
  - Extra challenge/extra support
- Planning back from the end point – consideration of ELG's and what you are teaching
- Purpose/context- is it important to always have a context? More important to focus on the maths not linking it to a theme/ topic. Is the activity relevant to the mathematics?
  - Is it accessible to all children?
  - Resources and manipulatives
  - Representations and structures