

How do I effectively teach number?

November 2023



Our Curriculum

Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built.

In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures.

It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.



By the end of Nursery...



Number

Say one number name for each item in order:

1, 2, 3, 4, 5

Show 'finger numbers' up to 5

Develop fast recognition of up to 3 objects, without having to count them individually ('subitising').

Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').

Link numerals and amounts

Experiment with their own symbols and marks as well as numerals

Recite numbers past 5.

Solve real world mathematical problems with numbers up to 5



Measure, geometry and spatial thinking

Compare quantities using language: 'more than', 'fewer than'

Talk about and explore 2D and 3D shapes using informal and mathematical language

Understand position through words alone with no pointing

Describe a familiar route. Discuss routes and locations.

Make comparisons between objects relating to size, length, weight and capacity.

Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc. Combine shapes to make new ones – an arch, a bigger triangle, etc.

Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper.

Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. Begin to describe a sequence of events, real or fictional

By the end of Reception...

Number

Count objects, actions and sounds

Subitise

Link the number symbol (numeral) with its cardinal number value

Count beyond ten

Compare numbers

Understand the 'one more than/one less than' relationship between consecutive numbers.

Explore the composition of numbers to 10.
Automatically recall number bonds for numbers 0–5
and some to 10

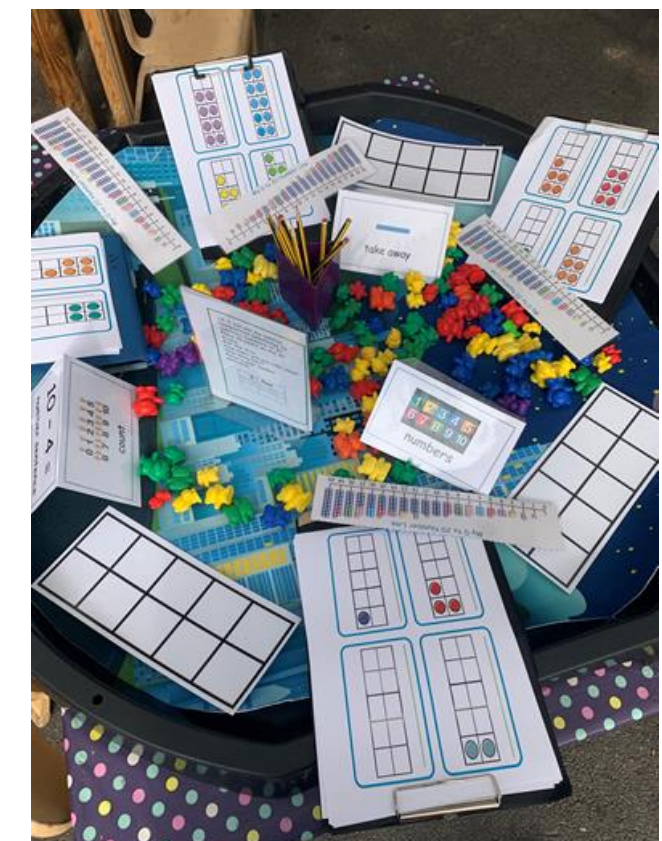
Measure, geometry and spatial thinking

Select, rotate and manipulate shapes to develop spatial reasoning skills.

Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.

Continue, copy and create repeating patterns.

weight and capacity





1 The one-to-one principle.

This involves children assigning one number name to each object that is being counted. Children need to ensure that they count each object only once, ensuring they have counted every object.

2 The stable-order principle.

Children understand that, when counting, the numbers have to be said in a certain order.



3 The cardinal principle.

Children understand that the number name assigned to the final object in a group is the total number of objects in that group.



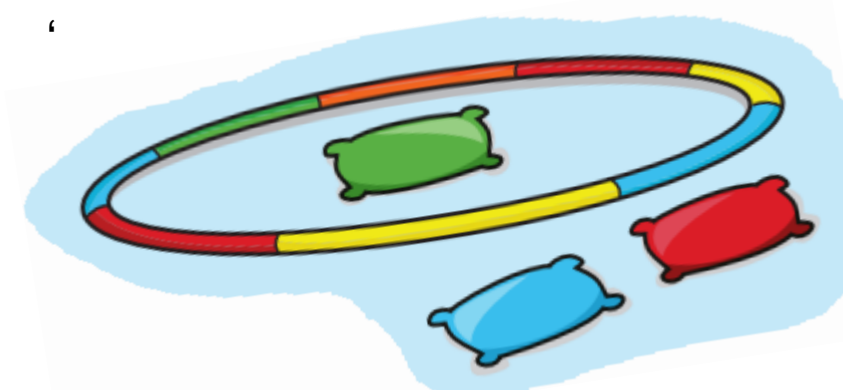
4 The abstraction principle.

This involves children understanding that anything can be counted, including things that cannot be touched, such as sounds and movements e.g. jumps.



5 The order-irrelevance principle.

This involves children understanding that the order in which we count a group of objects is irrelevant. There will still be the same number.



Characteristics of Effective Teaching and Learning

Finding out and exploring

Playing with what they know

Willing to 'have a go'

What if we try...?

Playing and Exploring
Engagement

Yesterday you... what might you do today?

Playing with their own ideas and that of others

Children given the time and space to play with concepts

This looks tricky, let's give it a go!

Developing the skill to become engaged and absorbed

Building confidence as mathematicians



Characteristics of Effective Teaching and Learning

Bring involved and
concentrating

Keeping trying

Enjoying achieving
what they set out to do

Did that turn
out as
expected?

Active Learning
Motivation

That was
tricky, well
done for
carrying on.

Opportunities to
develop resilience

Children are able to
remain focused
despite setbacks

Did you
change your
mind? That's
a good idea.

Be able to set a goal
and work towards it

Building confidence as
mathematicians



Characteristics of Effective Teaching and Learning

Having their own ideas

Making links

Choosing ways to do things

Is there a better way to...?

Creating and thinking critically
Thinking

The thrill of discovery and of children pursuing their own ideas

Developing mathematical reasoning

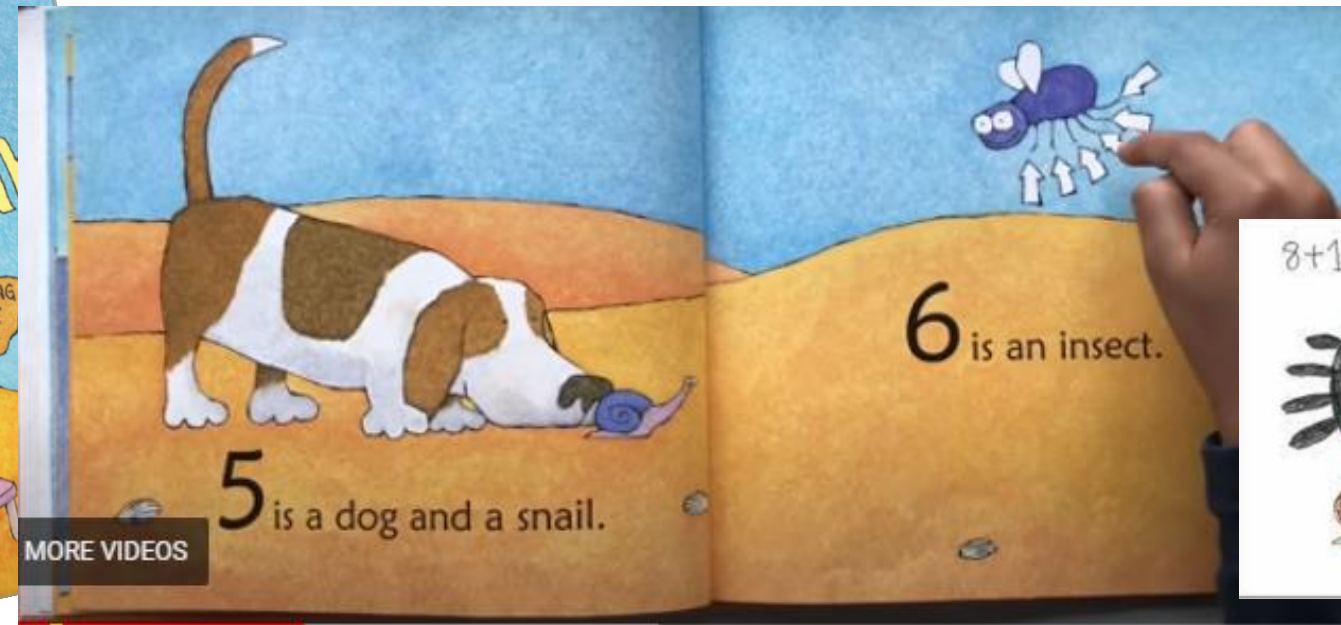
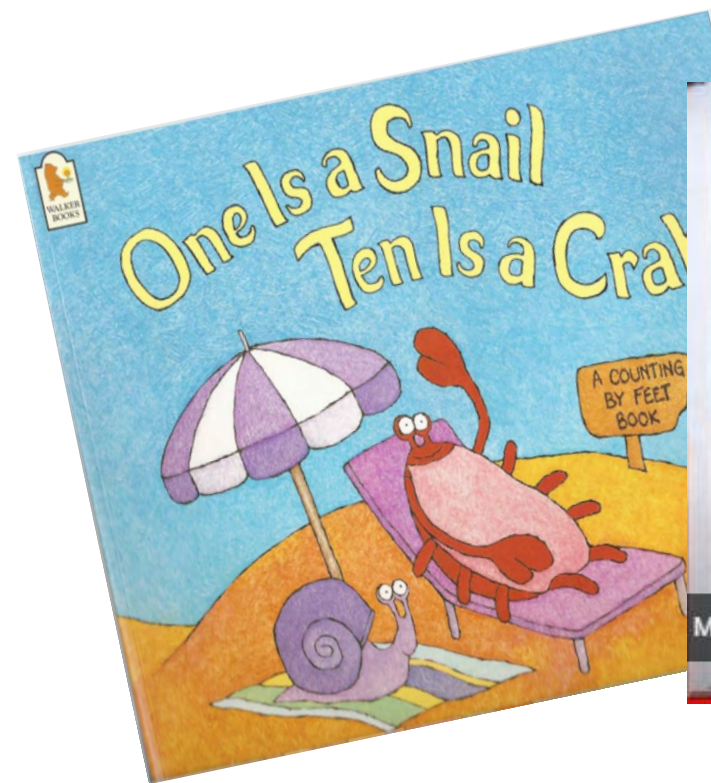
What might you try next?

Anticipate, visualise, predict, review and evaluate.

Building confidence as mathematicians



Exploring matsh through stories



Use books as starting points in maths but also to share across the school day



Provide opportunities for maths around the environment.
Sets of 'real life' objects that can be counted, sorted, ordered.
Containers such as egg boxes, baking tins, ice cube trays can be used in the home corner, mud kitchen, water tray.

6, 7 and 8

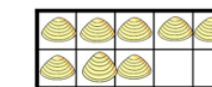


Maths Area

Encourage the children to think about where we see 6, 7, and 8 in everyday life and to make collections of 6, 7 and 8 objects in the classroom.
Sort these items into 6, 7 and 8
How else could you show 6, 7, and 8?

Loose Parts

Provide a range of loose parts such as buttons, beads, pebbles, shells and some ten frames. Ask the children to count 6, 7, and 8 items onto the 10 frames. How many do they have? Can they see without counting? The children may also enjoy filling large 10 frames outside.



Enhancements to areas of learning



Outdoors

Go on a mini-beast hunt.
Use magnifying pots to observe the creatures carefully. How many legs can they see? Provide pictures to help them identify what they find. Ask the children to make careful drawings of the creatures they find.

Kipper's Toybox

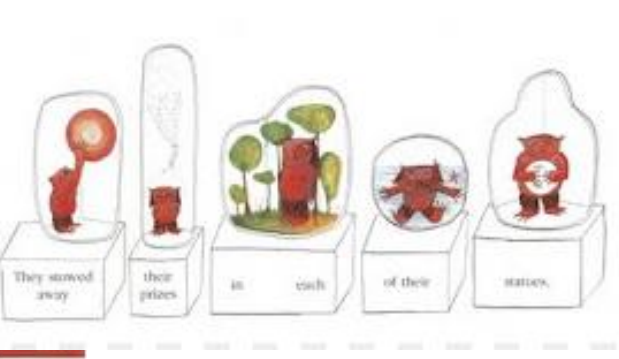
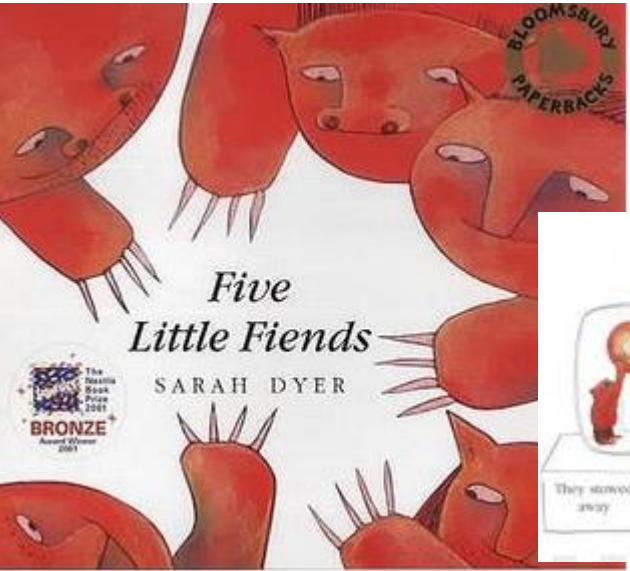
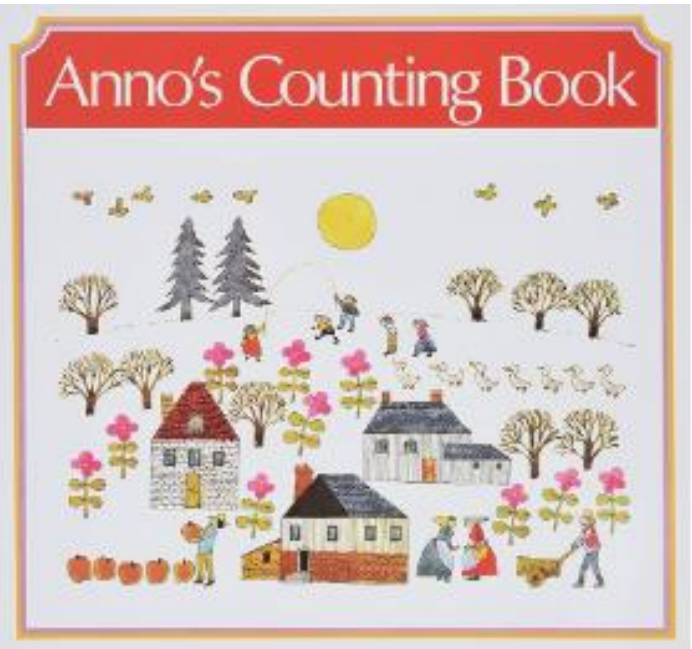
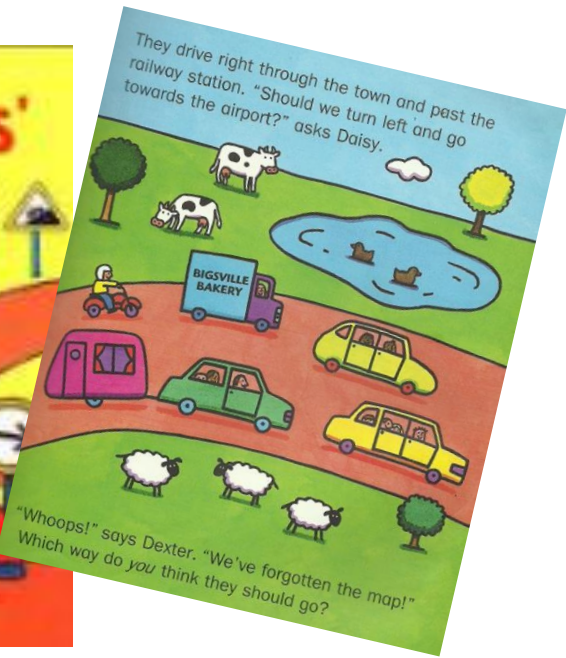
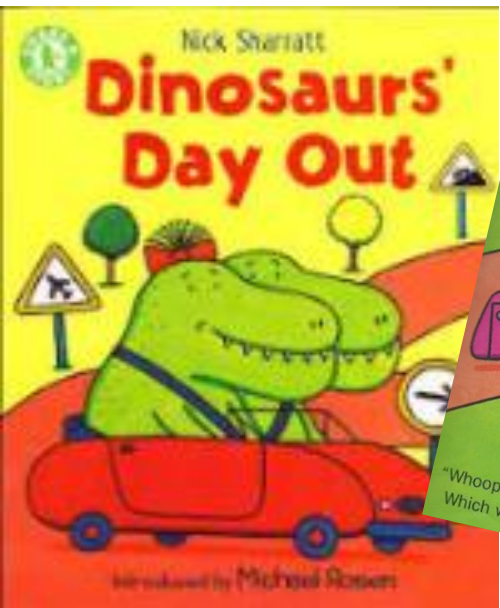
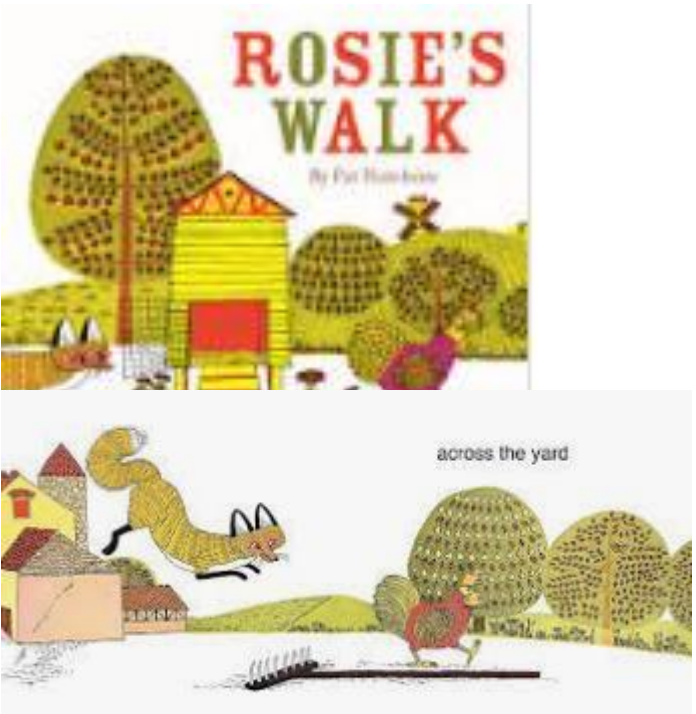
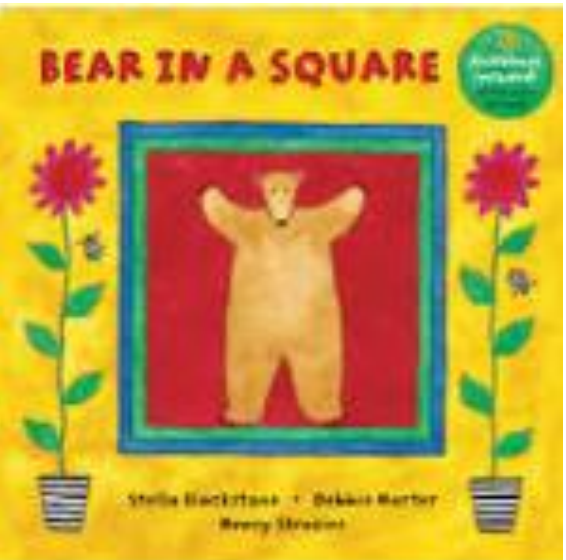
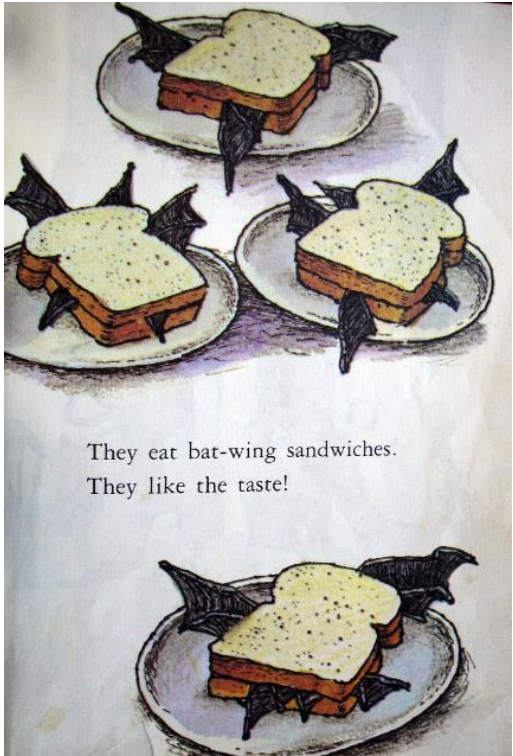
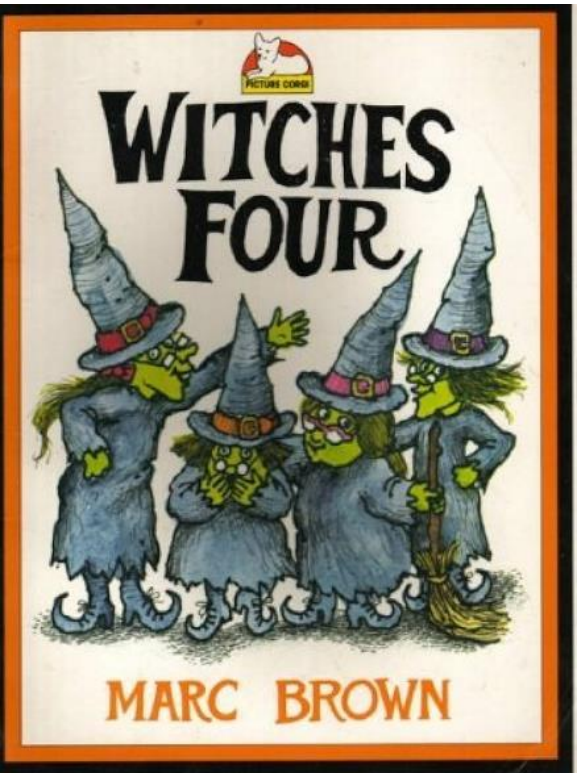
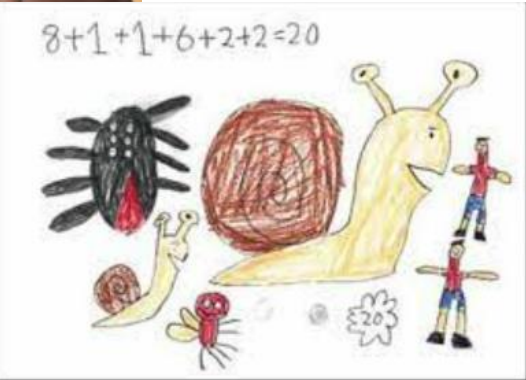
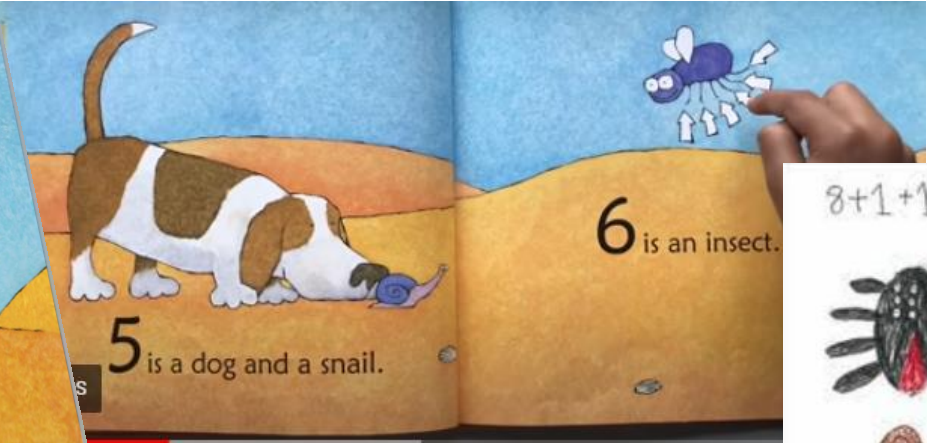
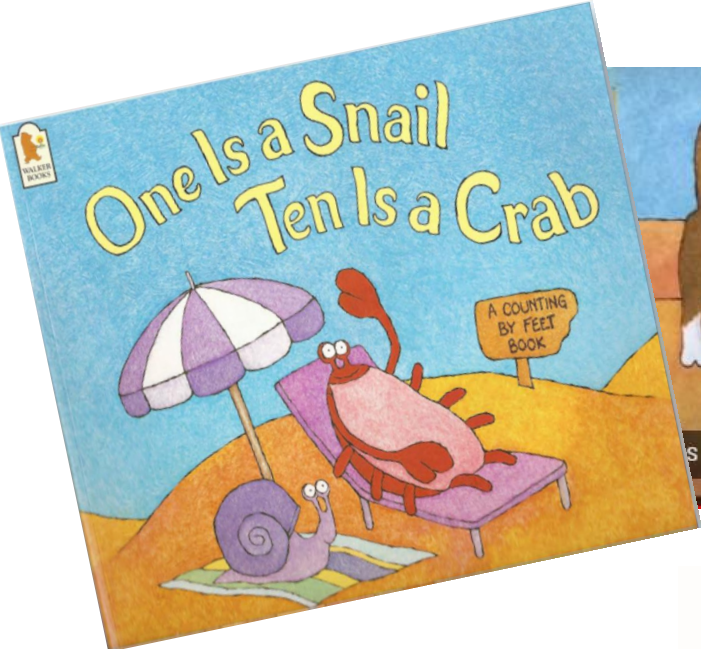
Provide a basket of toys for the children to use to re-enact the story. Take turns to 'hide' one of the toys. Can the children spot which toy is missing? How many toys are there now?
What if an extra toy arrives?
How many will there be now?



Use five/ten frames to organise resources.
Glue sticks, self registration, children's seats.
Can lead to all kinds of conceptual maths talk – four glue sticks, there's one missing.
How many children are here today?



Exploring maths through stories



How can I develop mathematical thinking?

Fill the frame!

- A five or ten frame
- Counters/items to place on
- Dice/spinner



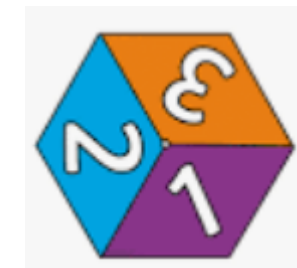
- 1) Start with an empty number frame
- 2) Roll the dice and put the number of items on the frame. Take it in turns.
- 3) The winner is the person to fill their frame



What if
we
try...?

Is there a
better way
to...?

Did that turn
out as
expected?



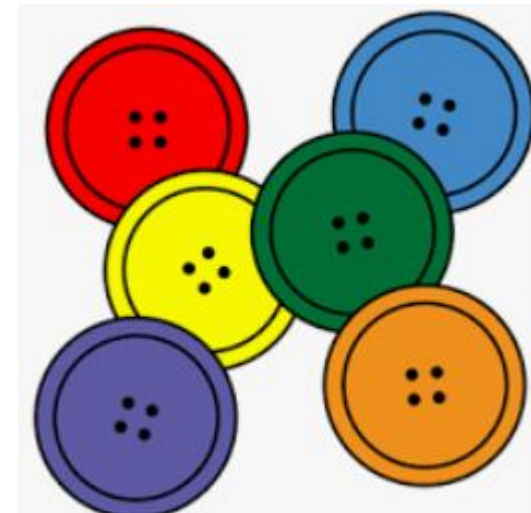
How can I develop mathematical thinking?

One or two

- A small dish/bowl/plate
- 12 items to place inside



- 1) Count the items inside to establish there are 12.
- 2) Decide who starts
- 3) When it is your turn you can decide to take one or two items from the dish
- 4) The person who takes the last item loses.



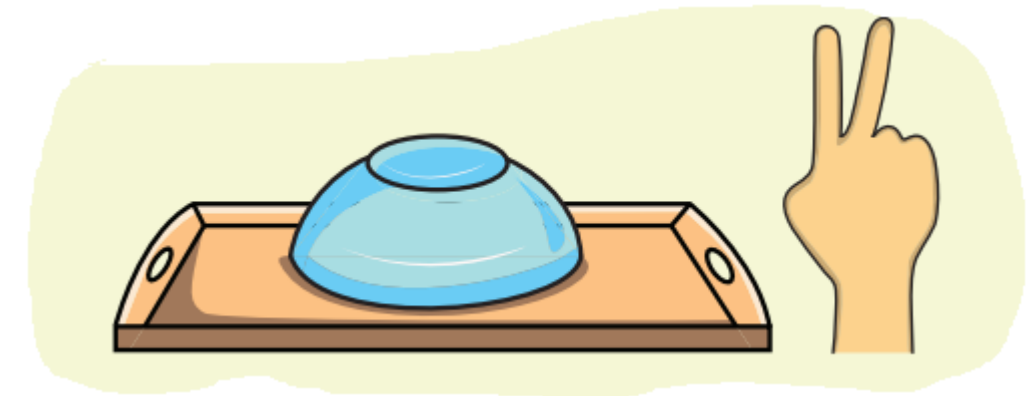
- *Can you make your partner lose?*
- *Does it matter who starts?*
- *What happens if... the person who removes the last item is the winner?*



How can I develop mathematical thinking?

What's hiding?

- A bowl/piece of material
- Items to hide



- 1) Count the objects to establish there are 3
- 2) Children show on their fingers how many.
- 3) Now hide 1 item. Children show on their fingers how many are hidden.
- 4) *Repeat, adding and taking away items from the hiding place.*

Adaptation: Kim's game

