

# 'Bringing Numbers to Life in the EYFS and Key Stage 1'

## Noticing numbers as digits and quantities

- **Noticing how we use number in every day life** e.g. on a clock so we know when to do something or how long something takes, how warm the weather is, how much something costs, speed limits on roads
- **Noticing numbers without digits** e.g. arrays, dice patterns, repeating patterns (linking to subitizing)

**Next Steps?** Children create a photo diary with their families spotting the numbers they are using everyday and explaining what would happen if they weren't there

## Keep on counting (but to explore number order rather than calculate):

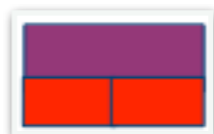
- **Finding out 'How many?'** When items can't be seen as a pattern e.g. counting pages in a book
- Counting to explore and practice '**ordinality**' of the number system; hearing the word order we use when counting in different sized groups (1's, 2's, 5's etc.) and in different directions

**Next Steps?** Play 'Counting Choirs' regularly as a class

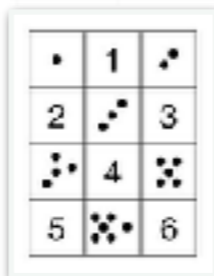
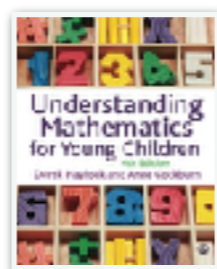
## 'How many?' Using noticing, describing and explaining pattern and form

- Connected to brain's **subitizing** ability
- Arranging items **atheistically**
- Being inspired by pattern and form in nature and art and developing own designs
- Grouping items and seeing amounts as whole and part groups (links to unitising)

**Next Steps?** Search for artists who use nature online and follow their Twitter feed or pages. Research Reggio Emilia's approach to using the environment to stimulate children's thinking and unleash their creativity.



Top of these units are equal to one of these units



## Using mathematics purposefully to organise my world (number, pattern and form)

- **Meaningful use of number and shape in my immediate classroom environment** (inside and out) e.g. using thermometers to monitor change in temperature every day, calendars that show the passing of time, 'shadow' labels to **organise** equipment, numbered clipboards so they can all be accounted for, wellies and outdoor clothes sizes, games with scores

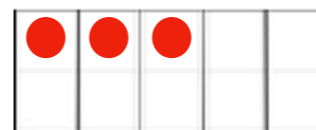
**Next Steps?** All teaching staff in your setting walk/sit/go through the days routine and consider where there's currently a missed opportunity to make number use far more explicit and accessible to the children (think clear, simple and big)

## Subitizing: Part/whole concept 'Numbers in numbers'

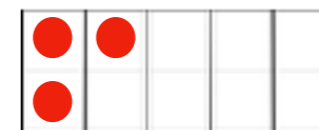
- **Using the brain's natural ability to 'see' a quantity** as both the whole and parts rather than being taught to 'count in ones'
- **Noticing, describing and explaining** numbers as part/whole
- Being able to **see things the way others see them** and in different ways ourselves

**Next Steps?** Build subitizing into every day and use it to not only teach maths but mainly to encourage noticing, involvement and collaborative talk and discussion.

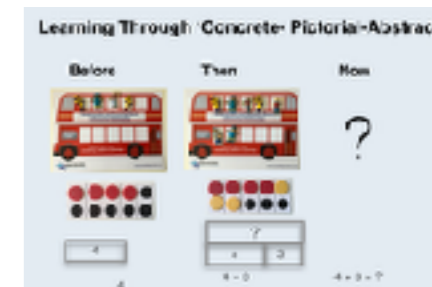
5's pattern on a ten frame



2's pattern on a ten frame (used in Numicon)

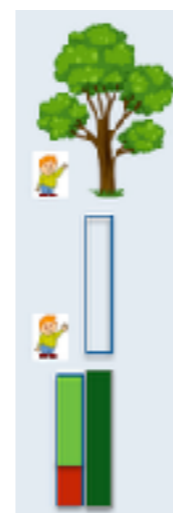


'5 frames' cards (available from [www.karenwildingeducation.co.uk](http://www.karenwildingeducation.co.uk))



## Comparison: Equal to, approximately equal to, more than, less/fewer than

- Nothing when something is **more/less or equal** to something else using easy to understand examples such as height (concrete real world)
- Developing **expert language** to describe relationships
- Using **paper strips** to represent values (moving to concrete maths world)
- Exploring **Cuisenaire rods**: Playing, building, designing, describing and explaining relationships
- Exploring **sticks and other natural items** instead of Cuisenaire (without colours)
- Developing **simple bar modelling** using Cuisenaire and teacher modelling drawn equivalent
- **Connecting Cuisenaire rods with real life examples** e.g. height and moving towards rods representing values but not literally
- **Connecting context, rods and bars** and extending to colour letter use e.g. orange is equal to yellow and yellow so  $o = y + y$
- **Extend to connect to ten frames** work involving numerical quantity and create same CPA journey but with cubes (and/or bead strings etc.) and bars with values



## Unitising: Equal groups and base ten

- **Understanding that units are equal groups** used in finding out 'how many?' Or "how much?"
- **We can group anything** we're counting and keep track of the number of complete groups (units) and part groups
- **Developing the language and concept of a 'finished group'** and a 'part of the next group' to understand base ten e.g. 12 is 'one finished group of ten and two of the next ten'
- **Exploring base ten using ten frame patterns** (5's and 2's patterns) and learning to recognise and use to develop fluency in all forms of calculation by 'seeing' number quantities

**Next Steps?** Build in learning ten frame patterns as a priority. Teach one pattern e.g. 5's pattern, first using bingo, dominoes, 'flash games' and then the other (2's pattern). Always apply what they've been learning immediately e.g. 'How many more to equal 20?' Could be used to make sure there's 20 pencils in a pot or children at tables.

# Essential Questioning and Teaching Adult Interactions: Subitizing

What do you notice?



How did you see it?

Now look at it in a different way and describe what you see



How did your partner see it? Say what they said.

Draw how you see it in the air

Draw how you see it on your whiteboard



What has changed? What has stayed the same?

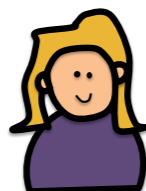
# 'Bringing Number to Life Using 'Tens Frames'

## Step 1: Getting started

### Why use a 'ten frame'?

Our counting system works by creating finished groups of ten or 'units' of ten.

To help us understand and learn to calculate using this 'base ten' system, we can use special 'number pictures' of the numbers alongside the way we write them as digits.



Imagining these 'number pictures' means we can see and find out 'how many?' without using counting. Counting small groups of objects is fine but once we increase the things we're counting or measuring we can easily make mistakes. Using 'number pictures' is much easier and we are far less likely to make errors.

### Collecting the learning 'tools' we need

#### Tool 1. Subitising

Subitising is an amazing skill! Your brain is SUPER good at it too!

Subitising is your brain's ability to know 'how many?' without counting. This is our first 'tool' and we'll use this to not only help us use 'tens frames' but also do lots of other calculating too.

To subitise, you have to practise your 'noticing' skills.



What do you see?  
How do you see it?

Did you see 3? Did you need to count? What else do you notice? Can you see the 2 and the 1 inside 3? Or the three 1s?

What about this?



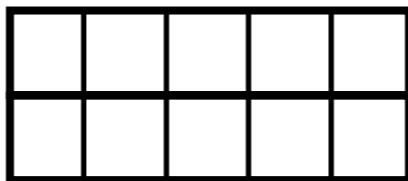
Is it still 3? How do you know?



How about now? What has changed and what has stayed the same?



### Tool 2. Fives and Tens Frames



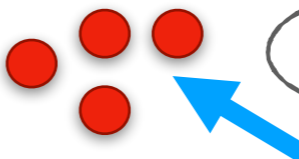
Most tens frames look like this. They are called 'tens frames' because there are ten equal parts arranged into two groups of five.

We're going to start with just a **five frame** and we're also going to put black spots on it (you'll find out why soon).



One of the most important rules to remember an practise with tens frames is **NOT TO COUNT!**

You will have had lots of practise counting so your brain will want to say the number names as you play counters on to the tens frame. **BUT**, this would be finding out 'How many?' By counting and we want to find out 'How many?' using a different strategy.



You can count here (if you need to)

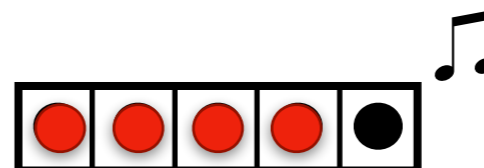
I can see 4



Now we're going to place the counters on this five frame and see what 'number picture' we create.

To stop your brain counting, you'll need to do something else...

**Singing works well!** Decide upon a song you'll always sing to yourself and this will stop you counting (and will help you practise your singing!)



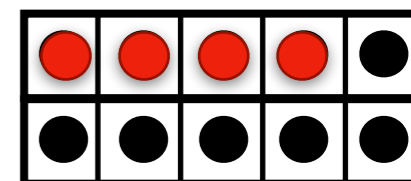
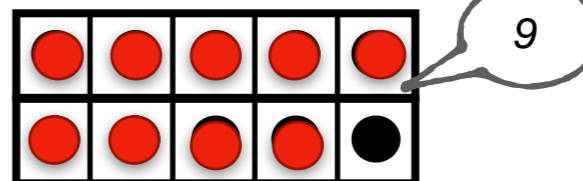
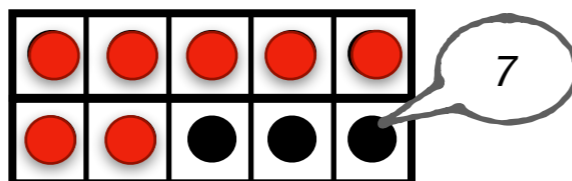
Now let's do some more noticing.

What do you see?  
How do you see it?

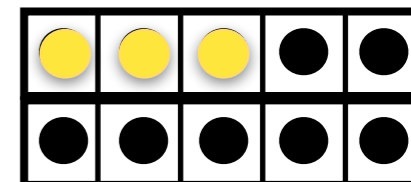
Did you notice the two 2's in the 4?  
Did you see that we still need 1 more to finish the 5? (The black spots help here!)

So, the is what 4 looks like but what do other numbers look like on the ten frame?  
When I've filled a five, I need start my other five. 5 and 5 equal a 'finished 10'

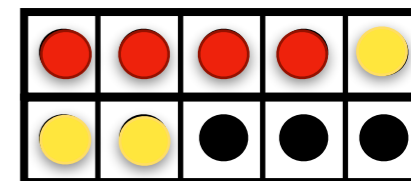
Count out a different number of counters and then **sing your song** whilst you fill in the tens frame. Remember to fill the first five and then move on to the second.



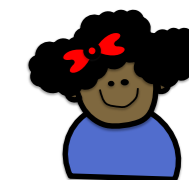
Here's 4 and here is 3



What number picture do I make if I add my 3 to my 4?



I can see the 7 pattern!



So, what?

So, that means 3 and 4 make a 7!  
There's a 3 and a 4 inside a 7!  
If I have 4 and then I add 3 more I will have 7!

What next? Now we're ready for 'Step 2'!



# The '100' Project: A provocation developed with 4 and 5 year olds within a Reggio-Inspired Setting in Leeds, UK

Using 'ten frames' to develop a sense of unitising leading to early experiences and understanding of place value using the 'base ten' system.

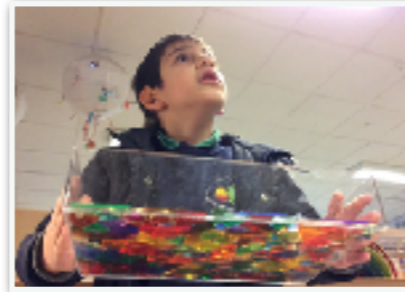
Project Leaders: Karen Wilding Education Ltd and Oakwood Primary Academy Nursery and Reception Unit, Harehills, Leeds, UK. 2016 -2018

## Our journey begins: 'Rand and the Rainbow'



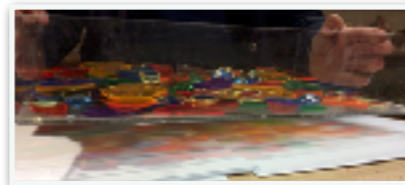
Rand had a collection of transparent coloured tiles and held them over a piece of white paper. He moved the tray of tiles closer to and further away from the paper and noticed what changed.

*'When it's up high it won't work but the rainbow works and it's high in the sky!'*



R: *'There are loads of rainbows.'*

T: *'How could you find out how many Rand?'*



Rand then employs the skills of some of the nursery children to help him fill the ten frames.

One shape for each space. Fill a ten frame before moving on to the next one.

T: *'Tell me about the what you're doing Rand?'*

R: *'A sentence has a full stop so each 10 needs one!'*

*'11 tens, 11 stones, 11 photos'. Rand choses to record using an ipad.'*



Rand begins to draw his representation of his frames.

He draws the showers to fill each ten frames but doesn't count as he draws.



### What Next?: As practitioners, we meet to reflect upon and plan how we might support Rand's line of enquiry the next day.

As Rand has filled more than 10 ten frames, we see an opportunity to show him what happens when groups of ten become a ten too!

We use the same large paper and make a giant ten frame large enough to fit his completed ten frames into. Then we draw another next to it.

T: *'What do you see Rand?'*

R: *'This ten frame is finished and theres one on the next ten frame.'*

T: *'When we have ten finished ten frames we can make a new number called one hundred.'*

R: *'100! Wow!!'*

T: *'Shall we look at how to write 100?'*



*'There's a massive ten frame!'*

Rand is encouraged to move his filled ten frames into the giant frame and see what happens.

*'This ten frame won't fit. It will have to go on this new ten frame.'*



We help Rand think about what the digits represent and 'read' them from his ten frames. '1 finished group of one hundred and 1 ten of the next hundred. No shapes on the next ten frame yet.

Rand writes '110'