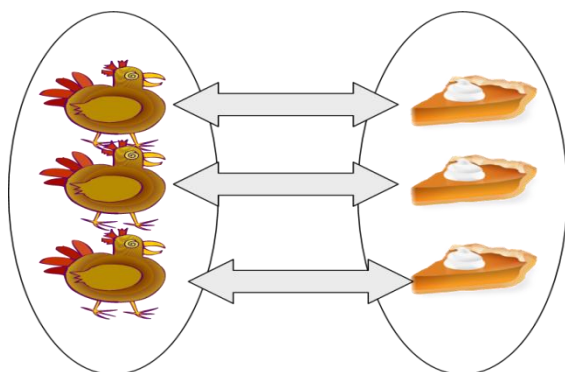


What is Three?

If a group of adults are asked to visualise the number three and describe the image that is in their mind the vast majority of responses will describe a set of three things, objects dots, fingers, etc. the image is much less frequently described as a numeral. So we might infer that to most people three is not just a symbol. ⁱ Other cultures use different names and symbols to represent it, but there is something about three that is the same the whole world over, and the overriding image that people envisage is a set of three things. Different people may use different images, fingers, dots, bananas whatever but the important thing is that they focus on what is the *same* about the different groups. So the first element of knowing “what is three” entails **recognising equivalence**.



- There is plenty of evidence that even very young children and animals can compare and know about quantities in this way. ⁱⁱ
- But we don't talk with images so when we communicate – we have to turn them into words.
- So there is a **social element** of knowing ‘what three is’ - and it entails being able to describe or name the concept of ‘three’ - using language.
- and that leads us to the question, is the word “three” an adjective or a noun? - and of course it is both – depending upon the context in which it is used.
- It must be an adjective because we use it to describe things, “three bananas, three people, etc”
- BUT it comes to be used as a noun - when we recognise that it names a certain kind of equivalence (threeness) i.e . what is the same about different groups.
- This is a step towards abstract thinking - it entails understanding that the word “three” can have a general meaning of its own, that is not necessarily related to the chickens or the pies - but is applicable in lots of other cases where quantities are the same.

Kids learn about the idea from experience of real groups.

But Three is not the things -- There can be three of any things –

But three doesn't exist in the child's reality - unless there are some things to be three of.

‘Three’ is an abstract idea – and stepping to it from concrete illustrations is harder than adults think.

It's so simple its hard for adults to understand that kids don't understand

Defining three

- If Three is a noun, (a name for something) we must be able to describe it.
- Think of some sentences that begin with “*Three is*”
e.g “Three is a curly number”. “Three is a small number”. “Three is more than two”. “Three is less than four”. “Three is a factor of twelve”. Etc.
- Which of these defines “three” most closely?
- There are a lot of other curly numbers and quite a few small numbers; there are other factors of twelve, but only one whole number is both ‘more than two and less than four.’
- This is the definition of three - it is defined by comparing its quantity with other quantities and placing it in the order.
- This gives us its place in the number line – and we can see its relationship to other numbers.
- We can understand this if we understand the number line – i.e understand about sequence – place / position – value.
- To generalise and use the number line we have to be able to re create it in memory and apply it in different ways
- We come to have sensory images of the number line through our visual, tactile and vestibular experiences of concrete things and events. – and being able to recreate them in our visual and kinaesthetic memories

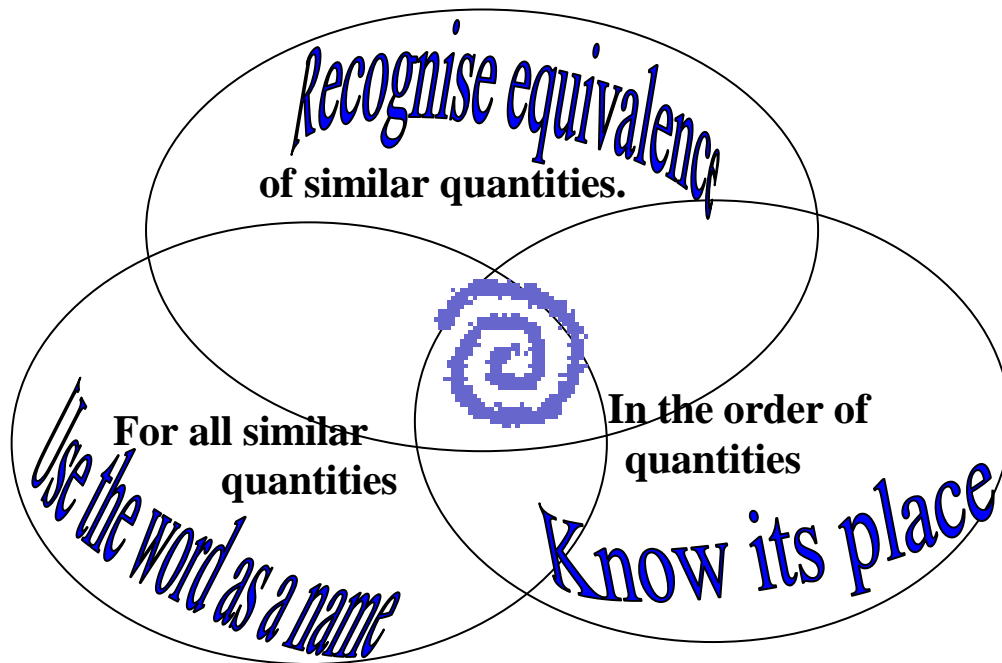
There are a number of elements that are required to have a concept of a number

- Concrete experiences of properties of groups
- Developing sensory images – visual – tactile and kinaesthetic.
- Discriminating sizes by process of comparison.
- Experience of describing groups with number words
- Understanding a word can describe a quantity. (adjective)
- Understanding that the descriptive term for a quantity of things can also be used as a name for other collections that are the same size.(noun)
- Concrete experiences of increasing and decreasing quantities. (iii)
- Being able to recognise equivalence of quantities.
- Knowing the place of the recognised quantity on the mental number line.
- Connecting the place to the generalised number name
- Generalising depends upon comparing and remembering a lot of instances and seeing the rules

This particular description relates to the relationship of quantities and value of the number , the **Cardinal** aspect. But it is not the only way that children experience numbers in life because we use the same number names and symbols in interchangeable ways with different emphasises - different uses in different contexts. Numbers as ordinals – numbers as cardinals – numbers as names (sometimes seemingly random)

From the flow of these experiences kids have got to pick out meanings that make sense .
Unless they understand contexts, and can think in abstract terms there is potential for confusion .

The Parts of the Cardinal Concept of Number.



ⁱ Haylock, D. Cockburn, A (1989) . Understanding Early Years Mathematics. P20 . Chapman London.

ⁱⁱ Dehaene, S. (1997) The Number Sense *pages 13 to 63* Penguin Books London

ⁱⁱⁱ Dehaene, S. (1997) The Number Sense *pages 69 and 66 to 70.* Penguin Books London