Pupil and School Support

Partners on the pathway to a positive future for children and young people

# Number Sense

Number Sense is a relatively new term, that describes a child's fluidity and flexibility with numbers and what numbers mean as well as an ability to perform mental mathematics and to look at the world and make comparisons.

If a student has good number sense they have:

1.An awareness of the relationship between number and quantity

2.An understanding of number symbols, vocabulary and meaning

3.The ability to engage in systematic counting, including notions of cardinality and ordinality

4.An awareness of magnitude and comparisons between different magnitudes

5.An understanding of different representations of number

6.Competence with simple mathematical operations

7.An awareness of number patterns including recognising missing numbers

**Top Tips:**

- Recognise and praise pupil effort, ideas, and strategies
- Offer tasks which are rich in reasoning opportunities,
- Encourage students to use and share different ideas, and show ownership e.g. 'my method'…
- Ensure there is depth, creativity, visuals and an atmosphere of 'wow' rather than we've got to cover…
- Value pupil mistakes as part of the learning process
- Use open questions and encourage multiple methods, ways of seeing and thinking
- Support students to collaborate and build off each other's ideas and ensure all students are involved
- Use assessment formatively

We must ensure pupils have built a firm foundation of Number Sense so that they can make connections and problem solve.

**Useful links:**

https://www.ncetm.org.uk/

https://nrich.maths.org/

This leaflet is part of a series of leaflets and online course from Pupil and School Support with regard to supporting children and young people in Mathematics.

# Number Sense starts early

Research shows that animals and pre-verbal children can distinguish between smaller and larger quantities - this seems to be hard-wired into the brain.

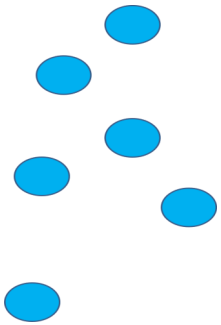
For example the lions of the Serengeti are good at recognising quantity. They attack and defend against other prides, but only if they outnumber them. Scientists have shown how animals will actively choose larger quantities and this may also be linked to survival instincts.

The human brain recognises object permanence at an early age. Babies' will look for objects that were there and

children as young as two years of age can confidently identify one, two or three objects before they can actually count with understanding (Gelman & Gellistel, 1978). Most adults, is between five and seven. This is called subitising.

When presented with more than five to seven objects, other mental strategies must be utilised.

When we consider counting, this might appear to be a very simple process, but in fact requires an understanding of 5 different principles:



One to one principle - assigning a single word to each item

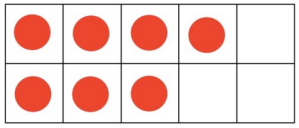
Stable order principle - knowing that the list of words must be a consistent one .

Cardinality – must know that counting leads to a product at the end.

Abstraction – must understand that anything can be counted – not just concrete objects .

Order-irrelevance – must understand that counting a set of objects in any order will give you the same answer.

## The Ten-ness of Ten



Once a basic number sense has been developed, it is important to develop a sense of ten, after all our number system is based on groups of ten. This supports not only place value, but mental calculation and fluency.