Partitioning

"…the creation of equal parts of a single whole, collection or combination or wholes and parts"

(Department for Education, Numeracy School Improvement)

Micro Content
Objects, quantities and collections can be shared to create equal parts
There is a relationship between the number of parts and the size and name of the parts and the number of parts increases as the size or share decreases
Objects, quantities and collections can be repeatedly halved and doubled e.g. use successive splits to show that one half is equivalent to 2 parts in 4, 4 parts in 8 etc.
An object, quantity or collection can be partitioned into a number of equal portions to show unit fractions so that say one third is more than one fourth etc.
The relative magnitude of a fraction is dependent on the relationship between the numerator (how many parts) and the denominator (total parts)
Fractions are renamed as equivalents where the total number of parts (denominator) and required number of parts (numerator) are increased by the same factor
Fractions with unlike denominators can be compared and ordered
Common fractions and decimal fractions can be compared, ordered and renamed in conceptual ways
Construct of fraction as division can be used to produce equal parts (equipartitioning)
Fractions are used to describe quotients and operators
Fractions are used to describe part-whole relations
Fractions are used to describe simple ratios
Percentages, fractions and decimals express the relationship between to quantities
Percentages are special part : whole ratios based on 100
Any given percentage can be used as a ratio to generate an infinite number of equivalent fractions (e.g. 50% = ½ 2/4 3/6 etc.)
Multiplicative arrays can be used to represent fractions, decimals and percentages
Benchmark fractions, decimals and percentages which are the equivalents of one another, can be used to estimate and to solve problems.

Micro Content from: Hurst, C., & Hurrell, D. (2014). *Developing the big ideas of number.*

Collated by Ashley Gardner for Freeling Primary School 2019

Common Misconceptions:

Diagnostic testing demonstrates many students misinterpret the meaning of the denominator. While students may exhibit an intuitive understanding of proportionality in terms of the 'out of' idea, this is limited to familiar contexts and proper fractions (eg 3 quarters of a pizza or the fraction of red M&M's in a whole packet). Few students at this level can visualise fractions as numbers which can be arrived at by partitive division (eg 3 pizzas shared among 4) and can 'live' uniquely on the number line as measures.

This could be due to/associated with:

■ viewing the denominator in the same way as the numerator (ie as a count or 'how many' number, rather than an indication of 'how much')

■ a limited exposure to practical experiences that show what happens as the number of parts are increased and how fractional parts are named

■ a 'groups of' only idea for multiplication and division and

■ little or no access to strategies that support the construction of appropriate fraction representations.

To be able to partition, students need to have established a meaningful basis for thinking about rational numbers in whatever form they appear (e.g. proper fractions, mixed fractions, decimal fractions, and percentages). To support the development of partitioning, students need to be able to work meaningfully with a wider range of numbers.

For students to be competent to manipulate fractions they need to recognise that:

■ equal parts are required

■ the number of parts is related to the name of the part (i.e. fifths for 5 parts, sixteenths for 16 parts)

■ as the number of parts increases, each part becomes smaller

■ fraction representations are created by partitioning discrete or continuous quantities into equal parts.