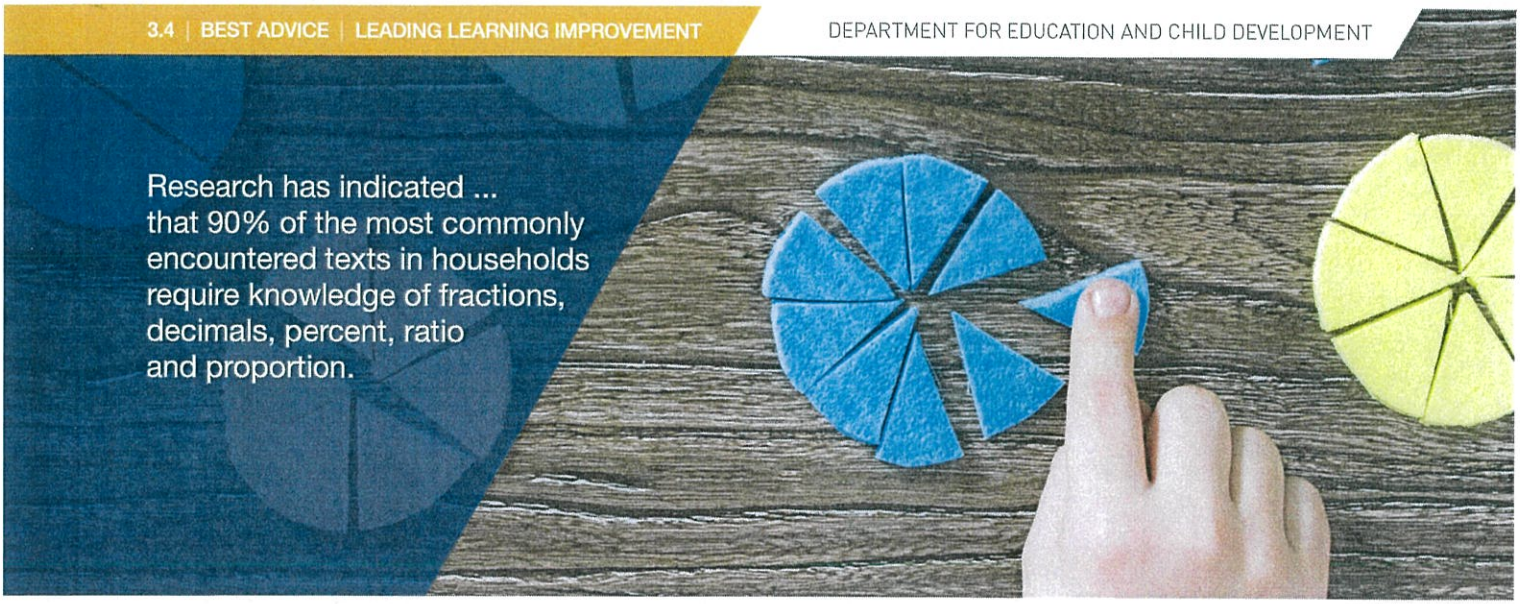

Partitioning

Why is partitioning an important notion?

The teaching and learning of fractions, particularly in the middle years and beyond, is a key aspect of numeracy as it underpins the proportional reasoning used in much of our everyday lives. Research has indicated, for example, that 90% of the most commonly encountered texts in households require knowledge of fractions, decimals, percent, ratio and proportion.

Previously it had been assumed that once learners can identify fractions from a given diagram, can identify a simple part of a given whole, or can shade a diagram to show a given fraction, then they are ready to start renaming fractions.

However, with pre-partitioned fraction diagrams, learners are often focusing only on the number to shade in rather than attending to all relevant aspects of partitioning: the unit/whole, the number of parts in the whole, the size of each part, and the number of parts required. In fact learners need to explore examples of correct and incorrect fraction representations if they are to recognise that equal parts/equal shares are necessary. Without focusing on the connection between fractions and partitioning, learners may adopt a narrow rule-based approach resulting in difficulties in:

- reading, renaming, ordering, interpreting and applying decimal fractions and common fractions, particularly those greater than 1
- recognising the applicability of ratio and proportion and justifying this mathematically in terms of fractions, percentage or written ratios (Siemon, Virgona & Cornielle, 2001).

This paper provides guidelines on partitioning and how leaders can support educators in fostering an understanding of partitioning, both in themselves and in their learners.

What is partitioning?

Partitioning is the process of dividing an object or objects into more parts. The whole should include all of these parts, with no parts left over. When working with fractions these parts must be equal. Fractions are a difficult concept for learners to grasp as there are so many different uses for fractions and so many different contexts that they appear in.

Fractions differ from whole number in that they are relative to the whole. For example, not all halves are the same as they depend on what the whole is. In addition, other key ideas need to be established, namely the need for equal parts, the number of parts helps to name the part (eg 5 equal parts are called fifths), and that as the number of parts increases (halves to quarters) the size of the part decreases (they get smaller).

An understanding of fractions through partitioning helps to develop these ideas. Paper folding experiences in order to generate halving, thirding and fifthing strategies enable learners to create their own fraction representations.

In contrast, there is considerable evidence to suggest that learners who do not create their own fraction diagrams through these generalised partitioning strategies have difficulty making sense of template fraction diagrams and formatted number lines (Empson, Junk, Dominguez & Turner, 2006: Lamon, 2007: Wong & Evans, 2008). Counting and colouring/shading someone else's pre-partitioned diagram is merely practice for existing knowledge and also encourages learners to apply whole number-based strategies. An example of whole number thinking is where a student might identify that 1 third is larger than 1 half because three is larger than two.

Government of South Australia
Department for Education and Child Development