

Key Concepts in Mathematics – Partitioning

If these concepts are not fully developed, students will find it difficult to engage meaningfully with core aspects of the Number, Algebra and Functions strands in later years.

Partitioning: *A deep understanding of how fractions are made, named and renamed.*

It provides the connection between fractions and the **sharing** or **partitive** idea of division, and to multiplicative thinking more generally.

How does the concept develop? Even before they come to school many young children show an awareness of fraction names such as half and quarter. During the first years of schooling, most will be able to halve a piece of paper, identify three-quarters of an orange and talk about parts of recognised wholes (e.g., bars of chocolate, pizzas, cakes, etc). **Beware!** Teachers and parents often think, then, that children understand the relationships inherent in fraction representations. For many children, however, they are simply using these terms to describe and number well-known objects. They may not be aware of or even paying any attention to the **key ideas** involved in a more general understanding of fractions. That is, that

- equal parts are involved
- the number of parts names the parts
- as the number of parts of a given whole is increased, the size of each part (or share) gets smaller.

Partitioning builds on ‘region’ and ‘area’ models of multiplication and is a necessary link in building fraction knowledge and confidence. The area model leads to the ‘**by**’ or ‘**for each**’ idea and, more generally, the **factor-factor-product** idea of multiplication and division, which regards multiplication and division as inverse operations. This is the idea needed to support all further work with rational numbers and in algebra.

Partitioning, therefore, is more than just the experience of physically dividing continuous and discrete wholes into equal parts; it also involves generalising that experience so that students can create their own fraction diagrams and representations on a number line and can understand the key ideas mentioned above.

A well-developed capacity to partition regions and lines into any number of equal parts supports fraction renaming and justifies the use of multiplication in this process. The concept of partitioning is best developed when students make their own fraction diagrams rather than interpreting those produced by others. **Halving, thirding** and **fifthing** are partitioning strategies that students can engage with that facilitate the development of understanding.

Encourage students to reflect and share their strategies, because

- ❖ verbalising brings the strategy to a conscious level and the student learns about their own thinking
- ❖ other students are given the opportunity to pick up a new strategy
- ❖ the teacher is given an opportunity to assess the type of thinking taking place and so can adjust the teaching accordingly.

Read the **case studies** and **tasks** for ideas on how you can support and track your students’ development of the concept of partitioning.