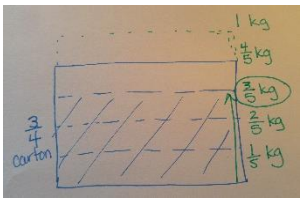
Op-L

Multiply fractions where the numerator of one fraction is the denominator of the other using models (e.g., $\frac{4}{5}$x $\frac{1}{4}$)

Chris' Ice Cream Carton

Description



Students are asked to create visual representations of their thinking using number lines and arrays to perform multiplication of fractions with unlike denominators. Students may use a variety of multiplication strategies, focusing on the part-whole meaning of fractions.

Mathematics

Current research concludes that students need to build fractional understanding, rather than using an algorithm, to explore the relationship between multiplication of fractions. When the numerator of one fraction is the same as the denominator of the other, some interesting relationships can be explored. When students have opportunities to model the problem, it is evident that the relationship between the two fractions (the fact that the numerator of one is the denominator of the other) means that the partitions of multiplicand (the fraction on which the multiplication is being performed) are actually created by the other fraction. Therefore, repeated addition can be used to solve what might seem to be a complex multiplication situation with fractions, allowing students to explore the idea that repeated addition of fractions relates directly to the multiplication of fractions.

Curriculum Connections

Students will:

- develop their understanding of multiplying fractions;
- explore the relationships between different kinds of fractions and the meaning of the numerator and denominator;
- model multiplication of fractions using visual representations.

Instructional Sequence

1. Partner students and distribute BLM 1. Students need to make visual representations as prompted, and answer questions 2 and 3 on the BLM.
2. Circulate as students work through the task and prompt using key questions.
3. Allow students time to complete task and respond to key questions.
4. To consolidate, have students share their thinking around the question: What do you notice about the numerator and the denominator in your answer and/ or the number sentence of your representation? Why do you think this is?

Highlights of Student Thinking

Students may:

- represent both fractions independently using a model but be unsure as to how they relate to each other, or how to model this relationship;
- be able to represent the fractions yet need support to recognize the relationship between the two different forms of measure; capacity, $\frac{3}{4}$ of a carton of ice cream, and mass, $\frac{4}{5}$ kg for a full carton of ice cream;
- benefit from a visual that illustrates the remainder or "empty" portion of the carton;
- need support to determine the operation needed to solve this problem; and
- be more successful with the use of precise labels.

Key Questions

1. How can you show $\frac{4}{5}$ of a kilogram?
2. How does the carton of ice cream relate to the $\frac{4}{5}$ kg?
3. What is the question asking? (i.e., $\frac{3}{4}$ of $\frac{4}{5}$, not $\frac{3}{4}$ of the whole)
4. How do labels help you to better understand the relationship between the numerators and denominators?

Materials

- BLM1 (one per student)
- grid paper (optional)