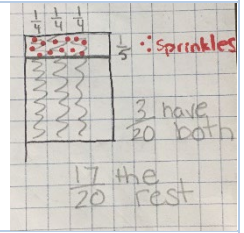


Multiply fractions using models and symbols.

Sprinkles on a Cake and Running Relay

Description:

This task engages students in exploring the use of a representation (i.e., rectangular area/array model or number line) to build a more conceptual understanding of what it means to multiply two fractions. Within the contexts provided, students will discuss the effectiveness of each model and use a Venn diagram to compare similarities and differences.



Mathematics:

Multiplication of fractions is frequently introduced using an algorithm before students have opportunities to build concepts that help them to understand why and how the algorithm works. Students benefit from opportunities to connect the multiplication of fractions to real world tasks with familiar contexts. When students engage in concrete tasks in which they are required to communicate and represent their thinking, they are better able to multiply fractions appropriately without error and to develop fractional number sense. These problems are designed to lead students to solve the same numerical question using different contexts and models. Students are also given the opportunity to compare models and their effectiveness in order to solidify the importance of appropriately selecting visual representations and accurate labels.

Curriculum Connections

Students will:

- multiply fractions with unlike numerators and denominators using models and symbols;
- reason about the effectiveness of various models.

Instructional Sequence

1. Pair students. Give half of the groups BLM 1 and the other half BLM 2.
2. Provide students with time to complete the tasks. An assortment of manipulatives should be accessible for all students. Allow students to explore, encouraging the use of a variety of models and asking the key questions while circulating.
3. Have each pair of students join up with another pair who received the other prompt (i.e., a pair with BLM 1 will pair up with a pair who worked on BLM 2) and have the newly created group complete BLM 3 to compare the similarities and differences (problem, strategies, solutions, models) between their representations.
4. Consolidate as whole group using Key Questions and /or discussing BLM 3 (focusing on the use of a model as a thinking tool to solve the question and understand the solution).

Highlights of Student Thinking

Students may:

- use an algorithm to solve but struggle to indicate what the solution represents;
- use an inefficient model that doesn't help them interpret their solution;
- attend to the complement (the other fraction of the whole) of the cake or the completed race;
- convert the race track into metres to help them understand and solve the problem;
- draw the cake as a long narrow rectangle instead of a more 'square' rectangle, which is mathematically correct but it may be a more difficult representation to work with precisely; and
- see this as a division question initially/not understand that this as a multiplication question, and/or have some confusion as to how this is multiplication.

Key Questions

1. What does your model represent?
2. How have your labels provided clarity?
3. What model could you use to show a relay race or a cake? (A rectangle connects more strongly to a cake while a number line relates to a race.)
4. What operation does your model represent? How does your model help you obtain your answer?
5. How has the Venn diagram and your discussion helped you understand the benefits of using various models in terms of context?

Materials:

- BLM 1 (1 copy per pair for half the class)
- BLM 2 (1 copy per pair for half the class)
- BLM 3 (1 copy per two pairs)
- white boards, grid paper, colored pencil crayons, washable chalk board markers
- a variety of manipulatives (e.g., colour tiles, relational rods)