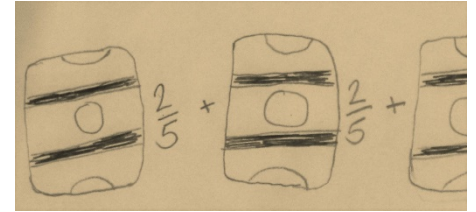


Divide fractions using models and symbols

Painting NHL Arenas

Description:

Students will use models and representations to determine if there is enough paint all of the blue lines in Canadian NHL arenas. Within this context, they will explore dividing two fractions with unlike numerators and denominators. This will allow them to explore the benefit of using representations (e.g., area models) as thinking tools to build a more conceptual understanding of what it means to divide two fractions.


Mathematics:

Division of fractions is a complex concept to understand. It is frequently introduced using an algorithm, removing the division process and not addressing the how or why. Students benefit from opportunities to connect division involving fractions to real world tasks with familiar contexts. This problem offers a range of solution strategies that provide students with different entry points (e.g., repeated subtraction, multiplication and repeated addition).

Curriculum Connections

Students will:

- divide fractions with unlike numerators and denominators using models and symbols;
- connect division of fractions to division of whole numbers;
- use their understanding of the context and fractions to make sense of the fractional remainder

Instructional Sequence

1. Provide pairs of students with 1 orange relational rod and 10 white rods. Have students explore a variety of unit fractions with the white units (e.g., tenths, fifths, thirds, halves) and discuss what unit fractions are possible. In the case where there is remainder, such as thirds, discuss what to do with it (e.g., with thirds, one remaining white cube needs to also be partitioned into thirds).
2. Distribute BLM 1 to each pair. Provide students with time to complete the task. Allow students to explore, while encouraging the use of a variety of models and asking the key questions while circulating.
3. Consolidate using Key Questions and/or comparing the various strategies. Discussion should include consideration of the remainder.

Highlights of Student Thinking

Students may:

- use a variety of strategies as entry points to the task, including repeated addition, repeated subtraction or multiplication;
- use rectangular models in a variety of ways to make sense of the problem (the model may represent the paint in the cans or the arena or a semi abstract grid); and
- attend to the remainder incorrectly when using computational strategies (e.g., $\frac{1}{4}$ of an arena instead of $\frac{1}{4}$ of $\frac{2}{5}$ of a can of paint).

Key Questions

1. How can you draw and label a model to help you understand the problem?
2. Why is your solution not a whole number? What does this remainder represent?
3. What operation does your model represent? How does your model help you understand your answer?

Materials:

- BLM1 (1 copy per pair)
- 1 orange and 10 white relational rods per pair
- manipulatives (e.g., relational rods, colour tiles)
- coloured pencil crayons