NWEA Assessment Item Illustrating 6.NS.A.1

Domain: The Number System
6.NS.A: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Calculator Availability: No

Use the information to answer the question.

Nami poured $\frac{2}{3}$ cup of rice into an empty jar. The rice filled $\frac{3}{5}$ of the jar.

How many cups of rice will fill an empty jar of the same size? Select and move numbers into the boxes. If there is no whole number, place 0 in the first box.

Alignment: 6.NS.A.1: Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*

This standard is a part of the concluding cluster for fraction operations. This item represents an important transition from dividing a whole number by a fraction, which asks *how many groups of the fraction can fit in the whole number*, to dividing a fraction by a fraction, which *asks how many fractional parts are in the other number*; in this item, the other number is a fraction. While there are multiple approaches to a solution, this item requires students to divide a fraction (2/3) by a fraction (3/5) to solve the problem.

Coherence: Interpreting and computing quotients of fractions builds on the work of grade 5, in which students learned to solve problems involving division of unit fractions with whole numbers.[5.NF.B] We can explore the various types of fraction division students are expected to know by the end of grade 6 by extending the context presented in this item. A question such as "How much rice will be in each container if 1/2 cup is distributed equally among 3 containers?" requires division of a fraction by a whole number. Alternatively, "How many 1/2 cups are in 3 cups of rice?" requires division of a whole number by a fraction. Therefore, "How many 1/2 cups will it take to fill a container that can hold ¾ cup?" would lead to the procedure of dividing 3/4 by 1/2, resulting in the answer "It would take 1 ½ one-half cups to fill a container that holds 3/4 cup." Solving problems involving quotients of fractions prepares students for computation with rational numbers,[7.NS.A] supports the grade 7 work with expressions and equations,[7.EE.A/B] and prepares students to understand the concept of an irrational number.[8.NS.A]

Rigor: This item attends to conceptual understanding, procedural skill, and application. Students must understand what it means to divide a fraction by a fraction in the context of a real-world scenario and be able to connect that concept to the grade-level procedure for dividing a fraction by a fraction. Because the required mathematics is not immediately obvious, students must interpret the context to decide how to solve the item.

Answer Key: There are multiple equivalent correct responses. One sample correct response is shown.

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