NWEA Assessment Item Illustrating 5.NF.B.4.a

Domain: Number and Operations–Fractions

5.NF.B: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Calculator Availability: No

What is the value of n when $\frac{5}{6}$ of n is 20? Enter the answer in the box.

[   ]

Alignment: 5.NF.B.4a: Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = (ac)/(bd)).*

This standard is intended to get at the conceptual understanding of multiplication of a fraction or whole number by a fraction as scaling. In this item, 5 partitions out of 6 equals 20, so each partition equals $20 \div 5$, or 4. It would be appropriate for students to model this problem by dividing a rectangle into 6 equal parts and labeling the value of each part in order to find the value of the whole. By labeling the collection of 5 partitions as 20, students can apply multiplicative reasoning to discern that each partition equals 4 and that the whole therefore represents 24.

Coherence: Students were formally introduced to multiplication with whole numbers in grade 3 when the focus was on multiplication as equal groups.[3.OA.A.1] In grade 4, the concept of multiplication as a comparison was developed with whole numbers.[4.OA.A] Students also began multiplying fractions by whole numbers in grade 4. It should be noted that grade 4 standards built upon the equal-groups interpretation of multiplication, in which students thought about 5 × 2/3 as 5 groups of two-thirds. This work continues in grade 5, when students multiply both fractions or whole numbers by fractions and solve problems about finding a fraction of a whole number.[5.NF.6] The work of finding a fraction of a whole number builds understanding of the idea of multiplication as scaling,[5.NF.5] which will be developed further in grade 6 when students are introduced to ratios[6.RP.A] and in grade 7 when they are introduced to scale drawings.[7.G.A.1]

Rigor: This item attends to conceptual understanding and procedural skill. In order to solve the problem, students reason about the relationship between the whole, the unknown, and 5/6 of the whole, which is 20. The computations involved in finding the answer represent a below-grade-level procedure.

Answer Key:

What is the value of n when $\frac{5}{6}$ of n is 20? Enter the answer in the box.

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