

NWEA Assessment Item Illustrating 4.NF.B.4.b

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Domain: Number and Operations—Fractions

4.NF.B: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Calculator Availability: No

Are the expressions in the table equal to $4 \times \frac{2}{6}$? Choose "Yes" or "No" for each expression.

Expression	Equal to $4 \times \frac{2}{6}$?
$4 \times \frac{4}{6}$	Yes / No
$4 \times \frac{1}{3}$	Yes / No
$8 \times \frac{1}{6}$	Yes / No

Alignment: 4.NF.B.4b: Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)*

It is important that when students multiply with fractions, they apply their understanding of whole-number multiplication to fraction multiplication. This means that students should understand multiplication as a number of groups with a certain number of objects in each group or as a multiplicative comparison between two quantities. For example, $4 \times 2/6$ can be interpreted as 4 groups of $2/6$ or $2/6 + 2/6 + 2/6 + 2/6$ or $4 \times 2/6$. The expression $4 \times 2/6$ can also be interpreted as $2/6$ is twice as large as $1/6$, so $4 \times 2/6$ is twice as large as $4 \times 1/6$, and $8 \times 1/6$ is twice as large as $4 \times 1/6$.

Coherence: Multiplying a fraction by a whole number extends the work in multiplication that students began in grade 3,^{3.OA.A.1} and that work extends into middle school. In grade 5, students will multiply fractions by fractions and multiply decimals.^{5.NF.B, 5.NBT.B.7} In grade 6, students will begin learning about ratios^{6.RP.A.2} and will learn to divide fractions by fractions.^{6.NS.A.1}

Rigor: This item attends to conceptual understanding and procedural skill. In this item, students complete three different comparisons with $4 \times 2/6$ to ensure that they have a conceptual understanding of multiples of fractions. Students also perform a grade 4 procedural skill by multiplying fractions by whole numbers.

Answer Key:

Are the expressions in the table equal to $4 \times \frac{2}{6}$? Choose "Yes" or "No" for each expression.

Expression	Equal to $4 \times \frac{2}{6}$?
$4 \times \frac{4}{6}$	Yes / <input type="checkbox"/> No
$4 \times \frac{1}{3}$	<input type="checkbox"/> Yes / No
$8 \times \frac{1}{6}$	<input type="checkbox"/> Yes / No

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