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## Study Guide for Fraction Multiplication

## Multiplying Fractions by Whole Numbers

To multiply a fraction by a whole number:

1. Rewrite the whole number as a fraction with a bottom number of 1 .
2. Multiply as usual.

Example: $5 \times \frac{2}{3}$

1. Rewrite 5 as a fraction:

$$
5=\frac{\frac{5}{1}}{}
$$

2. Multiply the fractions:
$\frac{5}{1} \times \frac{2}{3}=\frac{10}{3}$
3. Change the product $\frac{10}{3}$ to a mixed number.

$$
\frac{10}{3}=3 \frac{1}{3}
$$

Have you noticed that multiplying any number by a proper fraction produces an answer that's smaller than that number? It's the opposite of the result you get from multiplying whole numbers. That's because multiplying by a proper fraction is the same as finding a part of something.

1. Cancel the 6 and the 9 by dividing 3 into both of them: $6 \div 3=2$ and $9 \div 3=3$. Cross out the 6 and the 9 .
2. Cancel the 5 and the 20 by dividing 5 into both of them: $5 \div 5=1$ and $20 \div 5=4$. Cross out the 5 and the 20 .
3. Multiply across the new top numbers and the new bottom numbers:

$$
\begin{aligned}
& \frac{5}{6} \times \frac{3}{20} \\
& 2 \\
& \frac{1}{8} \times \frac{3}{2} \\
& \frac{3}{6} \times \frac{1}{4} \\
& \frac{1 \times 3}{2 \times 4}=\frac{3}{8}
\end{aligned}
$$

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$5 \times 2 / 3$ means:

## $2 / 3$ of 5 wholes

-Or-
5 groups of 2/3

-Or-
$2 / 3+2 / 3+2 / 3+2 / 3+2 / 3=10 / 3$

To make the improper fraction into a mixed number, move all of the shaded pieces to make as many wholes as you can completely, then see how many pieces (thirds, in this case) you have left over. We have 3 wholes and $1 / 3$ shaded in.


Or, divide. $10 \div 3=31 / 3$ (the 3 is the whole number quotient, the 1 is the remainder, and the denominator 3 is the original denominator, the size of the pieces).

