
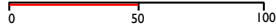
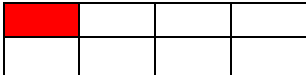
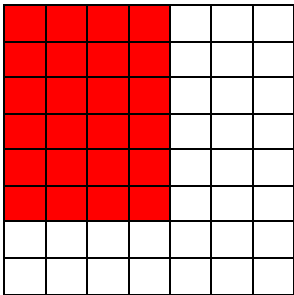

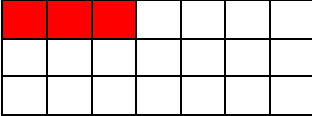


# Progression in Teaching and Learning Multiplying and Dividing Fractions

## Multiplying Fractions

Year Group and Notes	Written Calculations	Models and Images	Mental Calculations for fluency	Known Facts for fluency	Reasoning and Problem Solving
<p><b>Year 5/6</b></p> <ul style="list-style-type: none"> <li>- multiply proper fractions and mixed numbers by whole numbers.</li> <li>- solve problems which require knowing percentage and decimal equivalents of: <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{2}{5}</math>, <math>\frac{4}{5}</math></li> <li>- connect multiplication by a fraction to using fractions as operators.</li> <li>- use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</li> <li>- multiply simple pairs of proper fractions, writing the answer in its simplest form</li> </ul> <p>[for example, <math>\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}</math> ]</p>	<p><b>Fraction x Whole Number</b></p> $5 \times \frac{8}{10} =$ <p>Convert whole number into a fraction:</p> $\frac{5}{1} \times \frac{8}{10} =$ <p>Multiply denominators and numerators respectively</p> $\frac{5}{1} \times \frac{8}{10} = \frac{40}{10} \text{ simplify } \frac{4}{1} = 4$ <p><b>Fraction x Fraction</b></p> $\frac{3}{4} \times \frac{2}{5} =$ <p>Multiply the numerators:</p> $\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$ <p>Multiply the denominators:</p> $\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$ <p>Simplify the answer:</p> $\frac{6}{20} = \frac{3}{10}$ <p><b>Rectangle Model</b></p> <p>Use the rectangle model to visualise multiplying fractions.</p>	<ul style="list-style-type: none"> <li>- recognise fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle.</li> </ul>  <p>The red rectangle is <math>\frac{1}{2}</math> of the whole</p>  <p>50 is half of 100</p> <ul style="list-style-type: none"> <li>- Work backwards from a unit fraction to find the value of a whole. E.g. <math>\frac{1}{4}</math> of the area of a rectangle is <math>16\text{cm}^2</math> then the whole is <math>16 \times 4 = 64\text{cm}^2</math></li> </ul> <p><b>Rectangle Model:</b></p> $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$  $\frac{4}{7} \times \frac{6}{8} = \frac{24}{56}$ 	<ul style="list-style-type: none"> <li>- Practise calculations with simple fractions and decimal fraction equivalents to aid fluency,</li> <li>- List equivalent fractions to identify fractions with common denominators.</li> <li>- Quickly calculate simple fractions of amounts, E.g. <math>\frac{1}{2}</math> of 120, <math>\frac{1}{4}</math> of 60, <math>\frac{3}{4}</math> of 200</li> </ul>	<ul style="list-style-type: none"> <li>- recognise multiplication of amounts by a number <math>&lt;1</math> will make the amount smaller.</li> <li>- recognise that multiplication of amounts by number <math>&gt;1</math> but <math>&lt;2</math> will increase the amount, but by less than double.</li> <li>- times tables facts enable quick understanding of finding common factors allowing pupils to simplify fractions.</li> </ul>	<p>Nrich</p> <p>Rising Stars:</p> <p><a href="#">Year 4 – Would You Rather?</a></p> <p><a href="#">Year 4 – Fraction Strips</a></p> <p><a href="#">Year 5 – Tricky Triangles</a></p> <p><a href="#">Year 5 - Equivalence</a></p> <p><a href="#">Year 6 – Monsters</a></p> <p><a href="#">Year 6 – Raspberry Cupcakes</a></p> <p>Reasoning (NCETM)</p>

## Dividing Fractions

Year Group and Notes	Written Calculations	Models and Images	Mental Calculations for fluency	Known Facts for fluency	Reasoning and Problem Solving
<p><b>Year 5/6</b></p> <ul style="list-style-type: none"> <li>- divide proper fractions by whole numbers</li> </ul> <p>E.g. <math>\frac{1}{3} \div 2 = \frac{1}{6}</math></p> <ul style="list-style-type: none"> <li>- associate a fraction with division and calculate decimal fraction equivalents</li> </ul> <p>E.g. 0.375 for a simple fraction <math>\frac{3}{8}</math></p> <ul style="list-style-type: none"> <li>- Divide simple fractions</li> </ul> <p>E.g. <math>\frac{2}{3} \div \frac{1}{4} = \frac{8}{3}</math> or <math>2\frac{2}{3}</math></p>	<p><b>Fraction <math>\div</math> Fraction</b></p> $\frac{2}{6} \div \frac{1}{4} =$ <ul style="list-style-type: none"> <li>- Transform the divisor fraction into its <b>reciprocal</b>, then <b>multiply</b> the dividend fraction by the reciprocal.</li> </ul> $\frac{2}{6} \times \frac{4}{1} = \frac{8}{6}$ <p>Simplify if possible</p> $\frac{8}{6} = \frac{4}{3} \text{ or } 1\frac{1}{3}$ <p><b>Fraction <math>\div</math> Whole Number</b></p> <ul style="list-style-type: none"> <li>- Convert the whole number into a fraction first, then proceed as normal.</li> </ul> <p><b>Rectangle Model</b></p> <p>Use the rectangle model to visualise Dividing fractions.</p>	<p><b>Rectangle Model</b></p> <p><b><math>\div</math> by whole numbers</b></p> $\frac{1}{2} \div 2 = \frac{1}{4}$  $\frac{3}{7} \div 3 = \frac{3}{21}$ 	<ul style="list-style-type: none"> <li>- Calculate multiples of numbers</li> <li>- Adding numbers</li> </ul>	<ul style="list-style-type: none"> <li>- recognise dividing an amount by a number <math>&gt; 1</math> will make the amount smaller, while dividing an amount by a number <math>&lt; 1</math> will make the amount bigger.</li> </ul>	<p>Nrich</p> <p>Rising Stars:</p> <ul style="list-style-type: none"> <li><a href="#">Year 4 – Fraction Strips</a></li> <li><a href="#">Year 4 – Would You Rather?</a></li> <li><a href="#">Year 5 – Equivalence</a></li> <li><a href="#">Year 5 – Tricky Triangles</a></li> <li><a href="#">Year 6 – Juice for School</a></li> <li><a href="#">Year 6 - Monsters</a></li> <li><a href="#">Year 6 – Raspberry Cupcakes</a></li> <li><a href="#">Year 6 – Pies or Lines?</a></li> </ul> <p>Reasoning (NCETM)</p>