

Progression of Key Concepts in *Inspire Maths*

Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide

Inspire Maths 1	Inspire Maths 2	Inspire Maths 3	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6
<p>The foundations of fractions are laid in <i>Inspire Maths 1</i> by analyzing parts and whole using the 'part-whole' strategy. This appears throughout IM1A and IM1B.</p> <p>part 3 whole 8 part 5</p> <p>Key vocabulary:</p> <ul style="list-style-type: none"> part: TG1A p32 whole: TG1A p32 	<p>Fractions: TG2B Unit 12 p56</p> <p>Key concepts:</p> <p>Understanding fractions by using shapes to represent one whole with denominators up to 12 and write fractions with denominators up to 12 from given shapes.</p> <ul style="list-style-type: none"> Using model drawing as a concept to represent fraction contexts: <p>Let's use models to show fractions.</p> <p>The model shows a whole with 5 equal parts.</p> <p>2 parts are red and 3 parts are yellow. What fraction of the whole is red? Number of red parts = 2 Number of parts altogether = 5 The fraction of the whole in red is $\frac{2}{5}$.</p> <p>The fraction of the whole in yellow is $\frac{3}{5}$. 2 parts + 3 parts = 5 parts or 1 whole. $\frac{2}{5}$ and $\frac{3}{5}$ make 1 whole.</p>	<p>Fractions: TG3B Unit 14 p116</p> <p>• Numerator and denominator:</p> <p>$\frac{2}{3}$ ← numerator $\frac{2}{3}$ ← denominator</p> <p>In the fraction $\frac{2}{3}$, 2 is the numerator, and 3 is the denominator.</p> <ul style="list-style-type: none"> Understanding equivalent fractions using a fraction strip (paper) to show equal parts and write equivalent parts of a given fraction with the help of a model drawing: <p>Look at these fraction strips.</p> <p>One whole 1 out of 2 equal parts = $\frac{1}{2}$ 2 out of 4 equal parts = $\frac{2}{4}$ 4 out of 8 equal parts = $\frac{4}{8}$</p> <p>The fractions $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{4}{8}$ have different numerators and denominators. $\frac{1}{2}$ is equal to $\frac{2}{4}$. $\frac{1}{2}$ is also equal to $\frac{4}{8}$.</p> <p>$\frac{1}{2}$, $\frac{2}{4}$, and $\frac{4}{8}$ are equivalent fractions.</p> <ul style="list-style-type: none"> Write equivalent fractions of a given fraction using the multiplying/dividing factor technique expressing in its simplest form. 	<p>Fractions: TG4A Unit 5 p137</p> <ul style="list-style-type: none"> Express, interpret, read, draw and mark mixed numbers on a number line and as region models (translating pictorial representations of mixed numbers to symbolic and vice versa). Express, interpret, read, draw and mark improper fractions on a number line and as region models (translating pictorial representations of improper fractions to symbolic and vice versa): <p>Ruby has some pieces of ribbon.</p> <p>A $\frac{1}{3}$ m $\frac{2}{3}$ m B $\frac{2}{3}$ m or 1 m C $\frac{3}{3}$ m or 1 m D $\frac{4}{3}$ m or 1 m</p> <p>$\frac{1}{3}$ = 1 third $\frac{2}{3}$ = 2 thirds $\frac{3}{3}$ = 3 thirds $\frac{4}{3}$ = 4 thirds</p> <p>Look at piece D. It is $1\frac{1}{3}$ m long. There are 4 thirds in $1\frac{1}{3}$. $1\frac{1}{3} = \frac{3}{3} + \frac{1}{3} = \frac{4}{3}$</p> <p>$\frac{3}{3}$, $\frac{4}{3}$, and $\frac{5}{3}$ are equal to or greater than 1. They are called improper fractions.</p>	<p>Fractions (1): TG5A Unit 3 p116</p> <ul style="list-style-type: none"> Identifying and differentiating like and unlike fractions: <p>a Jack had $\frac{1}{3}$ of a biscuit. Ella had $\frac{2}{5}$ of a biscuit.</p> <p>$\frac{1}{3}$ and $\frac{2}{5}$ are like fractions. They have the same denominator, 5.</p> <p>b Peter had $\frac{1}{3}$ of a pizza. Ruby had $\frac{1}{4}$ of a pizza.</p> <p>$\frac{1}{3}$ and $\frac{1}{4}$ are unlike fractions. They have different denominators, 3 and 4.</p> <ul style="list-style-type: none"> Adding unlike fractions by making a systematic list of the multiples of the denominator and by drawing a model: <p>Bottle A contained $\frac{3}{4}$ l of milk. Iai poured $\frac{1}{2}$ l of it into Bottle B. How much milk was left in Bottle A? $\frac{3}{4} - \frac{1}{2} = ?$</p> <p>List the multiples of the denominators, 4 and 6. Multiples of 4: 4, 8, 12, 16, ... Multiples of 6: 6, 12, 18, 24, ... 12 is the lowest common multiple of 4 and 6.</p> <p>Subtract $\frac{1}{2}$ l from $\frac{3}{4}$ l of milk. To subtract, convert $\frac{1}{2}$ to like fractions first.</p> <p>As 12 is the lowest common multiple, I draw a model with 12 units.</p> <p>$\frac{3}{4} = \frac{9}{12}$ $\frac{1}{2} = \frac{6}{12}$ $\frac{9}{12} - \frac{6}{12} = \frac{3}{12}$ $\frac{3}{12}$ l of milk was left in Bottle A.</p>	<p>Fractions: TG6A Unit 4 p106</p> <ul style="list-style-type: none"> Four operations with fractions Dividing by a proper fraction: dividing a whole number by a proper fraction, dividing a proper fraction by a proper fraction <p>Faitha cut a rectangular paper strip into a number of pieces. Each piece was $\frac{1}{2}$ of the paper strip. How many pieces did Faitha cut the paper strip into?</p> <p>Number of pieces = $1 \div \frac{1}{2}$</p> <p>$1 \div \frac{1}{2}$ means this, "how many halves are there in 1 whole?"</p> <p>The model above shows that there are 2 halves in 1 whole. So $1 \div \frac{1}{2} = 2$ Faitha cut the rectangular paper strip into 2 pieces.</p> <ul style="list-style-type: none"> Word problems <p>Ratio: TG6A Unit 5 p145</p> <ul style="list-style-type: none"> Ratio and fraction: write and express ratio by comparing and analyzing parts and wholes (values): <p>Omara has 4 pencils. Miller has 15 pencils.</p> <p>We can show the number of pencils both children have by using a model.</p> <p>Omara's pencils: [4 boxes] Miller's pencils: [15 boxes]</p> <p>We can also arrange the model in another way.</p> <p>Omara's pencils: [4 boxes] Miller's pencils: [15 boxes]</p> <p>The ratio of the number of Omara's pencils to the number of Miller's pencils is 4 : 15. The ratio of the number of Miller's pencils to the number of Omara's pencils is 15 : 4.</p> <ul style="list-style-type: none"> Word problems (1)


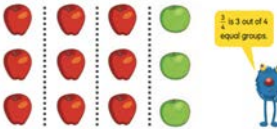



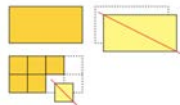


Progression of Key Concepts in *Inspire Maths*

Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide

Inspire Maths 2	Inspire Maths 3	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6																																										
<ul style="list-style-type: none"> Compare and order two or more fractions with the same denominator using rectangular strips or model drawings of the same size: <p>Mrs Hill has 3 cakes, all the same size. She cuts each cake into 8 equal parts. Jack eats $\frac{5}{8}$ of a cake, Tai eats $\frac{5}{8}$ of a cake and Miya eats $\frac{2}{8}$ of a cake.</p> <p>Who eats the most? Who eats the least?</p> <p>Jack: $\frac{5}{8}$ is greater than $\frac{2}{8}$. Tai eats more than Jack.</p> <p>Tai: $\frac{5}{8}$ is greater than $\frac{2}{8}$. Miya eats more than Tai.</p> <p>Miya: $\frac{2}{8}$ is smaller than $\frac{5}{8}$ and $\frac{5}{8}$. Jack eats less than Tai and Miya.</p> <p>Miya eats the most. Jack eats the least.</p> Compare and order two or more fractions with different denominators using rectangular strips or model drawings of the same size. Adding and subtracting like fractions. Solving word problems by recalling and applying 'part-whole' and 'adding on' concepts in addition of two fractions using model drawing. Recalling and applying 'part-whole' and 'taking away' concepts in subtraction of fractions using model drawing. 	<ul style="list-style-type: none"> Comparing fractions using the equivalent fraction method: <p>Ruby had $\frac{1}{2}$ of a pie.</p> <p>Peter had $\frac{3}{4}$ of an identical pie.</p> <p>Omar had $\frac{1}{4}$ of another identical pie.</p> <p>Peter had a bigger portion than Ruby. $\frac{3}{4}$ is greater than $\frac{1}{2}$.</p> <p>Omar had a smaller portion than Ruby. $\frac{1}{4}$ is smaller than $\frac{1}{2}$.</p> Adding related fractions (the related fractions are changed to like fractions first). Subtracting related fractions (the related fractions are changed to like fractions first). <p>Key vocabulary</p> <ul style="list-style-type: none"> numerator: TG3B p116 denominator: TG3B p116 equivalent fraction: TG3B p117 simplest form: TG3B p122 portion: TG3B p123 common denominator: TG3B p126 common numerator: TG3B p127 express: TG3B p129 	<ul style="list-style-type: none"> Conversion of fractions relating improper fractions to mixed numbers and converting between the two by separating an improper fraction into a whole and part of a whole, or by division, or by multiplication: <p>Change $\frac{5}{3}$ to a mixed number.</p> <p>$\frac{5}{3}$ is an improper fraction. $\frac{5}{3} = 4$ thirds $= 3$ thirds + 1 third $= \frac{3}{3} + \frac{2}{3}$ $= 1 + \frac{2}{3}$ $= 1\frac{2}{3}$</p> Adding and subtracting fractions: add two or three related fractions, subtract two related fractions, subtract a fraction from a whole number: <p>Anna and Sarah have an apple each. Anna eats $\frac{1}{2}$ of her apple and Sarah eats $\frac{1}{3}$ of her apple. What fraction of apples do they eat altogether?</p> <p>Anna: $\frac{1}{2} = \frac{3}{6}$</p> <p>Sarah: $\frac{1}{3} = \frac{2}{6}$</p> <p>They eat $1\frac{1}{2}$ apples altogether.</p> <p>Find the sum of $\frac{1}{2}$ and $\frac{1}{3}$.</p> <p>Always write mixed number and fraction answers in the simplest form.</p> 	<ul style="list-style-type: none"> Subtracting unlike fractions by making a systematic list of the multiples of the denominator and by drawing a model Fractions and division: a whole number when divided by another whole number can result in a whole number with or without a remainder, a proper fraction or a mixed number: <p>2 identical pizzas are shared equally among 3 pupils. What fraction of a pizza will each pupil get?</p> <p>Each pizza is divided into 3 parts equally. Each part is $\frac{1}{3}$ of a pizza.</p> <p>$2 \div 3 = \frac{2}{3}$</p> <p>Each pupil will get $\frac{2}{3}$ of a pizza.</p> <p>2 divided by 3 is the same as $\frac{2}{3}$.</p> Converting fractions to decimals: converting tenths, hundredths and thousandths, converting using long division, converting improper fractions and mixed numbers <p>Express $\frac{2}{5}$ as a decimal.</p> <p>$\frac{2}{5} = \frac{4}{10}$ $= \frac{4}{100}$ $= 0.4$</p> <p>Express $\frac{3}{20}$ as a decimal.</p> <p>$\frac{3}{20} = \frac{15}{100}$ $= \frac{15}{1000}$ $= 0.15$</p> <p>Express $\frac{1}{8}$ as a decimal.</p> <p>$\frac{1}{8} = \frac{125}{1000}$ $= \frac{125}{1000}$ $= 0.125$</p> <p>8 is a factor of 1000. $8 \times 125 = 1000$. By converting $\frac{1}{8}$ to $\frac{125}{1000}$, we can express the fraction as a decimal easily.</p> 	<ul style="list-style-type: none"> Comparing ratios: <p>Mr Smith made five mixtures of orange and pineapple juice using different amounts of juice. He recorded them in a table.</p> <table border="1"> <thead> <tr> <th>Mixture</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> </tr> </thead> <tbody> <tr> <td>Amount of orange juice (ml)</td> <td>300</td> <td>450</td> <td>600</td> <td>750</td> <td>900</td> </tr> <tr> <td>Amount of pineapple juice (ml)</td> <td>200</td> <td>300</td> <td>400</td> <td>500</td> <td>600</td> </tr> </tbody> </table> <p>Find the ratio of the amount of orange juice to the amount of pineapple juice in each mixture.</p> <table border="1"> <thead> <tr> <th>Mixture</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> </tr> </thead> <tbody> <tr> <td>Amount of orange juice</td> <td>3:2</td> <td>3:2</td> <td>3:2</td> <td>3:2</td> <td>3:2</td> </tr> <tr> <td>Amount of pineapple juice</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>What can you say about the ratios? We say that the ratio of the amount of orange juice used to the amount of pineapple juice used is the same in each mixture.</p> <p>We can also say that the amount of orange juice used and the amount of pineapple juice used are in a fixed ratio.</p> Word problems (2) <p>Percentage: TG6A Unit 6 p197</p> <ul style="list-style-type: none"> Finding percentages: express a fraction or a decimal as a percentage and vice versa, analyze the parts and whole to express the percentage giving the number of parts: <p>Let's recall.</p> <p>The big square is divided into 100 equal parts. 34 parts are shaded. The shaded parts can be expressed in the following ways:</p> <table border="1"> <thead> <tr> <th>As a Fraction</th> <th>As a Decimal</th> <th>As a Percentage</th> </tr> </thead> <tbody> <tr> <td>$\frac{34}{100}$</td> <td>0.34</td> <td>34%</td> </tr> </tbody> </table> Word problems (1) Word problems (2) 	Mixture	A	B	C	D	E	Amount of orange juice (ml)	300	450	600	750	900	Amount of pineapple juice (ml)	200	300	400	500	600	Mixture	A	B	C	D	E	Amount of orange juice	3:2	3:2	3:2	3:2	3:2	Amount of pineapple juice						As a Fraction	As a Decimal	As a Percentage	$\frac{34}{100}$	0.34	34%
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Inspire Maths 2	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6
<p>Key vocabulary:</p> <ul style="list-style-type: none"> fractions: TG2B p56 equal part: TG2B p56 unequal: TG2B p56 whole: TG2B p57 fractional parts: TG2B p61 fractions (one-half to one-twelfth): TG2B p61 fraction story: TG2B p67 like fractions: TG2B p74 	<ul style="list-style-type: none"> Fractions of a set: <p>There are 4 apples. 3 out of the 4 apples are red.</p>  <p>How many of the apples are red? Give your answer as a fraction. $\frac{3}{4}$ of the apples are red.</p> <p>Here is a set of 12 apples. The set of apples is divided into 4 equal groups. 3 out of the 4 groups of apples are red.</p>  <p>$\frac{3}{4}$ is 3 out of 4 equal groups.</p> <p>How many of the apples are red? Give your answer as a fraction. $\frac{3}{4}$ of the apples are red.</p> Word problems Decimals (1): TG4B Unit 9 p6 <ul style="list-style-type: none"> Understanding tenths: <p>Each whole is divided into ten equal parts. Each part is $\frac{1}{10}$ (one-tenth). We write $\frac{1}{10}$ as 0.1 as a decimal.</p>  <p>0.1 is 1 tenth written as a decimal.</p> <p>decimal point We read 0.1 as zero point one. Its value is 1 tenth.</p>  <p>Two parts is $\frac{2}{10}$ two-tenths. We write $\frac{2}{10}$ as 0.2 as a decimal.</p> <p>In the same way, I write $\frac{3}{10}$ as 0.3 and $\frac{4}{10}$ as 0.4.</p> Understanding hundredths Understanding thousandths Comparing and ordering decimals 	<ul style="list-style-type: none"> Adding mixed numbers with or without regrouping Subtracting mixed numbers with or without regrouping <p>Tai bought $2\frac{3}{4}$ m of material. He cut $1\frac{1}{8}$ m to make a bag. How much material did he have left?</p>  <p>To subtract, change $\frac{3}{4}$ and $\frac{1}{8}$ to like fractions first.</p> $2\frac{3}{4} - 1\frac{1}{8} = 2\frac{6}{8} - 1\frac{1}{8} = 1\frac{5}{8}$ <p>Tai had $1\frac{5}{8}$ m of material left.</p>  Word problems Fractions (2): TG5A Unit 4 p168 <ul style="list-style-type: none"> Product of proper fractions: multiplying two fractions is the same as finding the fractional part of another fraction; conceptualizing the meaning of multiplying two proper fractions with concrete representation; use of the cancellation (simplification) method to compute the product of two proper fractions; exploring and comparing the product of two whole numbers and the product of two proper fractions <p>Ella draws a rectangle and colours $\frac{2}{3}$ of it blue.</p> <p>She then draws red stripes over $\frac{1}{2}$ of the coloured parts.</p>  <p>$\frac{2}{3}$ of $\frac{1}{2}$ = $\frac{2 \times 1}{3 \times 2}$ = $\frac{2}{6}$ = $\frac{1}{3}$</p> <p>Jack draws an identical rectangle and colours $\frac{1}{2}$ of it blue.</p> <p>He then draws red stripes over $\frac{2}{3}$ of the coloured parts.</p>  <p>$\frac{1}{2}$ of $\frac{2}{3}$ = $\frac{1 \times 2}{2 \times 3}$ = $\frac{2}{6}$ = $\frac{1}{3}$</p> Word problems (1) 	<p>Key vocabulary</p> <ul style="list-style-type: none"> unitary method: TG6A p175

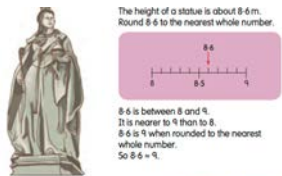
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Inspire Maths 4

• **Rounding decimals to the:**

- nearest whole number
- nearest tenth
- nearest hundredth:



• - **Fractions and decimals: expressing a fraction (whose denominator is a factor of 10 or 100) as a decimal and express a decimal as a fraction in its simplest form:**

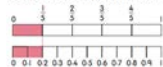
Express the fraction $\frac{1}{5}$ as a decimal.



So $\frac{1}{5}$ is 0.2 as a decimal.

Here is another way to show $\frac{1}{5} = 0.2$.

Look at the fraction bar and the number line.



Express $\frac{1}{4}$ as a decimal.

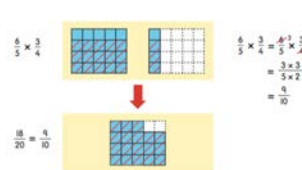


So $\frac{1}{4}$ is 0.25 as a decimal.

Inspire Maths 5

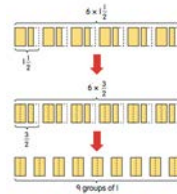
• **Product of an improper fraction and a proper or improper fraction:**

Find the product of $\frac{6}{5}$ and $\frac{3}{4}$.



• **Product of a mixed number and a whole number:**

There are 6 children in the Walker family. Each child is given $1\frac{1}{2}$ sandwiches. How many sandwiches did they get altogether?

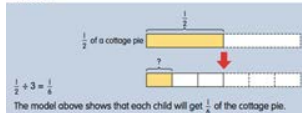


• **Word problems (2)**

• **Dividing a fraction by a whole number:**

Half of a cottage pie is shared equally among 3 children. What fraction of the cottage pie will each child get?

Method 1



Method 2



Method 3



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Inspire Maths 4	Inspire Maths 5
<p><u>Decimals (2): TG4B Unit 10 p77</u></p> <ul style="list-style-type: none"> • Refer to addition and subtraction progression document • Refer to multiplication and division progression document <p><u>Key vocabulary</u></p> <ul style="list-style-type: none"> • mixed number: TG4A p137 • simplify: TG4A p141 • cancellation: TG4A p141 • improper fraction: TG4A p142 • conversion: TG4A p146 	<ul style="list-style-type: none"> • Word problems (3) <p><u>Decimals: TG5B Unit 7 p2 p28</u></p> <ul style="list-style-type: none"> • Converting fractions to decimals: converting tenths and hundredths, converting thousandths • Using a calculator • Word problems <p><u>Decimals: TG5B Unit 7 p6</u></p> <ul style="list-style-type: none"> • Refer to multiplication and division progression document <p><u>Measurement: TG5B Unit 8 p53</u></p> <ul style="list-style-type: none"> • Converting a measurement from a larger unit to a smaller unit • Converting a measurement from a smaller unit to a larger unit <p><u>Percentage: TG5B Unit 10 p108</u></p> <ul style="list-style-type: none"> • Per cent • Converting more fractions to percentages • Percentage of a quantity • Word problems <p><u>Key vocabulary</u></p> <ul style="list-style-type: none"> • unlike fractions: TG5A p116 • proper fractions: TG5A p116 • per cent: TG5B p108