Striving To Improve

PHOTOCOPY MASTERS

Fractions

For students aged 11 - 15 years who are underachieving at their year level.

Ready-Ed Publications

Edited by Mirella Trimboli

Contents

Teachers' Notes

This resource is focused on the Number and Algebra Strand of the Australian Curriculum for lower ability students and those who need further opportunity to consolidate these core areas in Mathematics.

Each section provides students with the opportunity to consolidate written and mental methods of calculation, with an emphasis on process and understanding.

The section entitled *Understanding Fractions* enables students to re-encounter ideas of equivalent fractions, simplifying fractions, improper fraction, mixed numerals and comparing fractions. These activities are a useful way to scaffold a new unit of Mathematics and will help build confidence for lower ability students to attempt more challenging problems at their year level.

The section entitled *Calculating With Fractions* walks students through the four core calculations. The activities are designed to guide student learning with minimal input from the teacher and there is a strong emphasis on process and understanding. Students explore addition and subtraction of fractions with and without common denominators. Similarly, students explore how to multiply and divide fractions before applying them to a variety of applications. Students also begin to see the common uses for fractions by finding fractions of a quantity and be expressing various quantities as fractions.

The activities can be used for individual students needing further consolidation in a mainstream classroom or as instructional worksheets for a whole class of lower ability students. The activities are tied to Curriculum Links in the Australian Curriculum ranging from grade levels of Year 4 through to Year 7 and are appropriate for students requiring extra support in Years 7, 8 and 9.

It is hoped that *Fractions* will be used to help teachers provide appropriate resources and support to those students in greatest need. The book as a whole can be used as a programme of work for those students on a Modified Course or Independent Learning Programme. Activities are sufficiently guided so that students can work independently and at their own pace without constant supervision and guidance from the teacher.

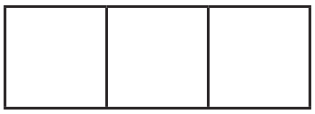
✪ Shading Fractions 2

✶ TASK A **Shade each of the following fractions on the diagrams.**

a) $\frac{3}{8}$

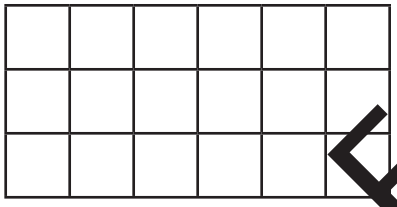
b) $\frac{2}{5}$

c) $\frac{1}{6}$



d) $\frac{3}{4}$

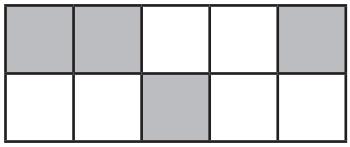
e) $\frac{4}{9}$



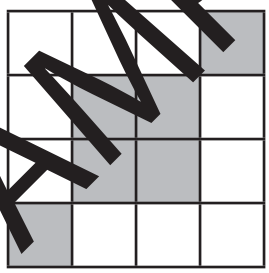
f) $\frac{6}{10}$

✶ TASK B **Look at each shaded diagram and write down the fraction that is shaded.**

a)

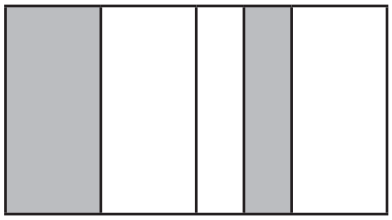


b)

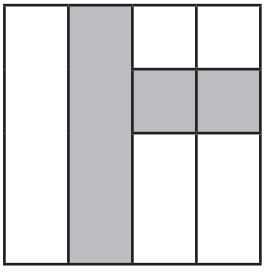


c)

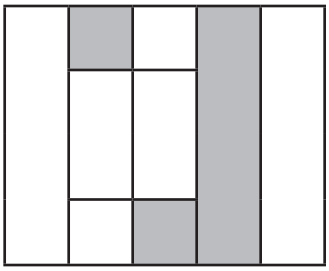
d)



e)



f)



✶ TASK C: CHALLENGE YOUR PARTNER

Create four of your own shaded grids (you may like to use grid paper) similar to those in Task B above.
See if your partner can give you the correct fraction for each of your grids.

Ready-Ed Publications

✪ Simplifying Fractions 2

We can simplify fractions in another way. By looking at the fraction chart on page 13 we can see that $^{6}/_{8}$ is equivalent to $^{3}/_{4}$. If we look at the fraction itself we can see that for $^{6}/_{8}$ to become $^{3}/_{4}$ we divide both the numerator and the denominator by 2.

$$\frac{6}{8} \div \frac{2}{2} = \frac{3}{4}$$

✶ TASK A **Simplify these fractions by dividing by two.**

$\frac{8}{12} =$ $\frac{4}{10} =$ $\frac{2}{6} =$ $\frac{2}{4} =$ $\frac{4}{12} =$

✶ TASK B **We can divide by other numbers to simplify fractions. Write simplified fractions for these:**

$\frac{9}{12} \div \frac{3}{3} = \frac{3}{4}$ $\frac{5}{20} =$ $\frac{80}{100} =$ $\frac{3}{18} =$ $\frac{4}{12} =$

Sometimes it is possible to divide the numerator into the denominator to simplify a fraction. For example, with $^{3}/_{9}$ we have 3 as the *numerator* and 9 as the *denominator*. We know that 3 goes into 9 exactly three times and we can simplify the fraction to $^{1}/_{3}$ because 3 goes into 3 once and into 9 three times.

✶ TASK C **Use this method to simplify the fractions below.**

$\frac{4}{12} =$ ..... $\frac{3}{15} =$ ..... $\frac{10}{20} =$ ..... $\frac{4}{8} =$ ..... $\frac{4}{16} =$ ..... $\frac{5}{20} =$ .....

$\frac{20}{200} =$ ..... $\frac{2}{10} =$ ..... $\frac{40}{80} =$ ..... $\frac{50}{100} =$ ..... $\frac{6}{18} =$ ..... $\frac{7}{14} =$ .....

✶ TASK D **Express these fractions in the simplest form.**

$\frac{4}{20} =$ ..... $\frac{6}{30} =$ ..... $\frac{9}{18} =$ ..... $\frac{3}{27} =$ ..... $\frac{5}{30} =$ ..... $\frac{4}{10} =$ .....

$\frac{8}{80} =$ ..... $\frac{10}{100} =$ ..... $\frac{2}{12} =$ ..... $\frac{15}{20} =$ ..... $\frac{3}{12} =$ ..... $\frac{8}{10} =$ .....

✶ TASK E **Match a fraction on the top line with a fraction on the bottom line.**

$\frac{3}{4}$	$\frac{7}{8}$	$\frac{9}{20}$	$\frac{200}{1000}$	$\frac{3}{50}$	$\frac{6}{200}$
$\frac{14}{16}$	$\frac{6}{8}$	$\frac{3}{100}$	$\frac{4}{20}$	$\frac{6}{100}$	$\frac{18}{40}$

✶ TASK F: CHALLENGE

In his last maths test Aaron scored 75 out of a possible 100. What is the simplest way of expressing the fraction of the sums that Aaron correctly answered?

Ready-Ed Publications

✪ Improper Fractions 2

Follow this example: $\frac{3}{4}+\frac{2}{4}=\frac{3+2}{4}=\frac{5}{4}=1\frac{1}{4}$

$^5/_4$ is known as an improper fraction because the numerator is greater than the denominator. This means that there is more than 1 whole. We know that $^4/_4$ is equal to one whole so $^5/_4$ must be equal to 1 whole and $^1/_4$ or $1^1/_4$.

A. Express the answers to these sums as improper fractions.

$\frac{5}{9}+\frac{6}{9}=$ ..... $\frac{5}{6}+\frac{2}{6}=$ ..... $\frac{4}{10}+\frac{8}{10}=$ ..... $\frac{6}{7}+\frac{3}{7}=$ .....

$\frac{3}{5}+\frac{4}{5}=$ ..... $\frac{7}{8}+\frac{4}{8}=$ ..... $\frac{10}{15}+\frac{10}{15}=$ ..... $\frac{12}{20}+\frac{15}{20}=$ .....

B. Simplify these fractions. The first one has been done for you.

$1\frac{2}{8}=1\frac{1}{4}$ $1\frac{3}{6}=$ ..... $2\frac{6}{8}=$ ..... $5\frac{8}{10}=$ .....

$2\frac{6}{9}=$ ..... $3\frac{6}{12}=$ ..... $3\frac{4}{6}=$ ..... $2\frac{4}{8}=$ .....

C. $^4/_4 = 1$ so $1^4/_4$ is equal to 2. Complete the following by adding the fractions.

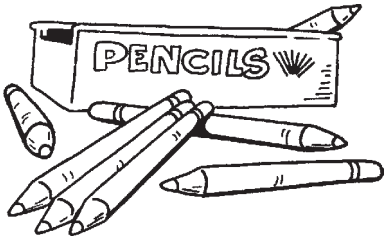
$\frac{2}{5}+\frac{3}{5}=$ ..... $\frac{4}{6}+\frac{2}{6}=$ ..... $\frac{5}{9}+\frac{4}{9}=$ ..... $1\frac{2}{4}+1\frac{2}{4}=$ .....

$2\frac{2}{9}+1\frac{7}{9}=$ ..... $7\frac{9}{10}+1\frac{1}{10}=$ ..... $\frac{2}{3}+1\frac{1}{3}=$ ..... $4\frac{5}{6}+2\frac{1}{6}=$ .....

D. Jessica had four whole oranges and half of an orange and Ben had one orange and a half. If they put them together how many oranges would there be?

E. Hamish divided six bananas into thirds. How many thirds did he now have? Express your answer as an improper fraction. .....

F. Suzanne had four sets of pencils each with eight colours and half a set with four colours. Drew gave her three pencil sets and four extra pencils. Write a number sentence to show how many pencils Suzanne has.



.....

✪ Addition And Subtraction With The Same Denominator 1

You can only add or subtract fractions easily if the denominator is the same.

Add whole numbers and fractions separately.

Rule: whole number × denominator + numerator = new numerator.

e.g. $1\frac{1}{2} + 5\frac{1}{2} = (6) + \frac{2}{2} = 6 + 1 = 7$

You + or – fractions by + or – the **numerator**. Do not change the denominator.

Sum	**+ or – whole numbers and fractions separately**	**Change any improper fractions**	**+ or – all parts**
Add these:			
$3\frac{2}{3} + 2\frac{1}{3}$	(5) and $\frac{2}{3}$	None	$5\frac{2}{3}$
$4\frac{5}{8} + 1\frac{7}{8}$	5 and $\frac{12}{8}$	$5 + 1\frac{4}{8}$	$6\frac{4}{8}$ or $6\frac{1}{2}$
$2\frac{5}{6} + 5\frac{2}{6}$			
$4\frac{3}{7} + 2\frac{5}{7}$			
$2\frac{4}{5} + 4\frac{3}{5}$			
$3\frac{3}{4} + 5\frac{3}{4}$			
Subtract these:			
$3\frac{3}{6} - 1\frac{2}{6}$	2 and $\frac{1}{6}$	None	$2\frac{1}{6}$
$3\frac{8}{9} - 2\frac{2}{9}$			
$4\frac{8}{10}$ $3\frac{7}{10}$			

✪ Subtraction With Mixed Numerals 1

To subtract mixed numerals, first convert the fractions to improper fractions.
For example:

$2\frac{1}{5} - 1\frac{3}{5}$

$= \frac{11-8}{5}$

$= \frac{3}{5}$

$3\frac{1}{8} - 2\frac{3}{8}$

$= \frac{25-19}{8}$

$= \frac{6}{8}$

$= \frac{3}{4}$

✶ TASK A **Convert these fractions to improper fractions to find the answer.**

$2\frac{1}{6} - \frac{4}{6}$ = ...

$3\frac{4}{9} - \frac{7}{9}$ = ...

$2\frac{4}{10} - 1\frac{8}{10}$ = ...

$6\frac{3}{7} - 5\frac{4}{7}$ = ...

✶ TASK B **Express these whole numbers as improper fractions. The first one has been done for you.**

$2 = \frac{18}{9}$

$3 = \frac{\square}{6}$

$4 = \frac{\square}{5}$

$6 = \frac{\square}{2}$

$4 = \frac{\square}{1}$

$5 = \frac{\square}{2}$

$6 = \frac{\square}{3}$

$7 = \frac{\square}{3}$

✶ TASK C **Subtract the fractions from the whole numbers by changing to improper fractions. Write your answer as a mixed numeral.**

$8 - \frac{3}{4}$ = ...

$7 - \frac{3}{5}$ = ...

$4 - \frac{2}{3}$ = ...

$10 - \frac{2}{6}$ = ...

$3 - 2\frac{10}{20}$ = ...

$4 - \frac{75}{100}$ = ...

$6 - \frac{7}{30}$ = ...

$2 - \frac{1}{9}$ = ...

✶ TASK D **Subtract these fractions.**

$3\frac{4}{5} - 2\frac{1}{5}$ = ...

$10 - \frac{2}{3}$ = ...

$5\frac{2}{6} - \frac{3}{6}$ = ...

$3\frac{2}{5} - 2$ = ...

$9 - \frac{6}{7}$ = ...

$4 - \frac{7}{20}$ = ...

$3\frac{9}{50} - 2\frac{11}{50}$ = ...

$8 - 3\frac{4}{5}$ = ...

✶ TASK E: CHALLENGE

During the term Steve had to read 5 books. So far he has read 2 books and $\frac{4}{6}$ of a book. What fraction of the books does he still have to read?

✪ Multiplying And Dividing Fractions

Multiplying two fractions together is easier than adding two fractions together!
All you need to do is multiply the numerators together and multiply the denominators together.
Then just simplify your answer.
For example, if we want to multiply $\frac{2}{3}$ and $\frac{3}{5}$ we can work out the answer like this: $\frac{2\times3}{3\times5}=\frac{6}{15}=\frac{2}{5}$

✶ TASK A Calculate each of the following.

a. $\frac{1}{4}\times\frac{2}{5}=$

b. $\frac{5}{8}\times\frac{2}{6}=$

c. $\frac{3}{4}\times\frac{4}{7}=$

d. $\frac{6}{8}\times\frac{2}{9}=$

e. $\frac{3}{11}\times\frac{4}{6}=$

f. $\frac{5}{10}\times\frac{5}{6}=$

g. $1\frac{1}{45}\times1\frac{2}{3}=$

h. $2\frac{1}{2}\times3\frac{5}{7}=$

i. $4\frac{1}{6}\times2\frac{3}{4}=$

Dividing two fractions is easy! We simply flip the second and multiply. For example, if we want to divide $\frac{4}{5}$ by $\frac{1}{2}$ we can work out the answer like this: $\frac{4}{5}\times\frac{1}{2}=\frac{4\times2}{5\times1}=\frac{8}{5}=1\frac{3}{5}$

✶ TASK B Calculate each of the following.

a. $\frac{4}{5}\div\frac{2}{3}=$

b. $\frac{3}{4}\div\frac{1}{6}=$

c. $\frac{5}{9}\div\frac{2}{7}=$

d. $\frac{5}{11}\div\frac{1}{3}=$

e. $\frac{7}{8}\div\frac{1}{4}=$

f. $\frac{10}{12}\div\frac{2}{5}=$

g. $1\frac{1}{3}\div\frac{1}{4}=$

h. $2\frac{5}{8}\div1\frac{1}{2}=$

i. $10\frac{3}{5}\div2\frac{1}{5}=$

✶ TASK C: PERSONAL CHALLENGE

Use your skills learned on this page to calculate, without a calculator, this sum:

$$\frac{2}{5}\times\frac{5}{3}\times\frac{4}{10}\div\frac{1}{10}\times\frac{3}{4}\times\frac{4}{10}\div\frac{4}{6}\times\frac{2}{6}$$

✪ Fractions Of An Amount 2

Let's say we want to calculate $\frac{2}{5}$ of 40.
First of all we want to see how many times 5 can be divided into 40.
5 goes into forty 8 times.
So 40 broken into fifths looks like 8 8 8 8 8.
The numerator tells us that we want 2 of these fifths. So we want 2 lots 8, which is 16.
So $\frac{2}{5}$ of 40 is 16.

✶ TASK A **Without a calculator, use the above method to calculate each of the following.**

a. $\frac{3}{4}$ of 40

b. $\frac{2}{5}$ of 20

c. $\frac{2}{3}$ of 60

d. $\frac{2}{6}$ of 36

e. $\frac{4}{5}$ of 80

f. $\frac{3}{7}$ of 35

g. $\frac{5}{6}$ of 30

h. $\frac{3}{10}$ of 150

i. $\frac{3}{5}$ of 50

j. $\frac{5}{7}$ of 49

k. $\frac{4}{5}$ of 15

l. $\frac{4}{9}$ of 36

m. $\frac{3}{8}$ of 32

n. $\frac{2}{7}$ of 21

o. $\frac{2}{9}$ of 27

p. $\frac{3}{11}$ of 44