1:01 Numbers to One Million

Content strand: Number and Algebra

Substrand: Whole Numbers 1

Content statements:

- Recognise, represent and order numbers to at least tens of millions.

Outcomes: MA3-1WM, MA3-4NA

Teaching Suggestions

- Use an abacus or place-value chart and counters to model numbers to 1 000 000. You could use the abacus tool on the IWB DVD.
- Provide students with frequent opportunities to read and write numbers to 999 999 presented orally.
- In Question 1, discuss the concept of zero as a place-holder when writing numbers and its effect if the zero is not included.
- Revise expanded notation (i.e. partitioning using place value) in Question 3, e.g. 678 924 is 600 000 + 70 000 + 8000 + 900 + 20 + 4.
- Relate expanded notation to digit value, e.g. the value of the 7 in 678 924 is 7 ten thousands (70 000).
- The value of a digit is equal to the product of the digit and the value of its column, e.g. the 3 in 123 476 is 3 × 1 000 or 3000.
- Remind students of place-value relationships, i.e. 10 thousand = 100 hundreds = 1000 tens = 10 000 ones.
- Discuss the use of K to denote thousands, e.g. a salary of $87K means a salary of $87 000.
- Use the example questions on the IWB DVD.

Language

numeral, expanded notation, place value, hundreds of thousands, thousands, hundreds, tens, units, ones, zero, abacus, place-value chart, product, digit, figures, value

Resources

- abacus
- place-value charts
- counters
- IWB DVD 5

Cross-reference

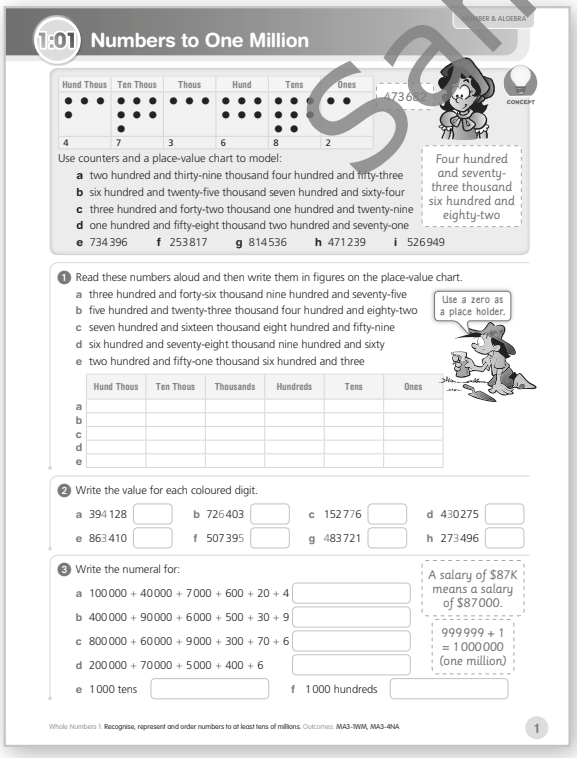
See also: pp. 2, 3
Year 4 p. 29
Year 6 p. 1

Evaluation

Is the student able to do the following?

- read and write numbers to 1 000 000 using place value
- record numbers in expanded notation

Sample Pages



1:01 Numbers to One Million

Hund Thous | Ten Thous | Thous | Hund | Tens | Ones
4 | 7 | 3 | 6 | 8 | 2

Use counters and a place-value chart to model:
a two hundred and thirty-nine thousand four hundred and fifty-three
b six hundred and twenty-five thousand seven hundred and sixty-four
c three hundred and forty-two thousand one hundred and twenty-nine
d one hundred and fifty-eight thousand two hundred and seventy-one
e 734 396 f 253 817 g 814 536 h 471 239 i 526 949

Four hundred and seventy-three thousand six hundred and eighty-two

1 Read these numbers aloud and then write them in figures on the place-value chart.
a three hundred and forty-six thousand nine hundred and seventy-five
b five hundred and twenty-three thousand four hundred and eighty-two
c seven hundred and sixteen thousand eight hundred and fifty-nine
d six hundred and seventy-eight thousand nine hundred and sixty
e two hundred and fifty-one thousand six hundred and three

Use a zero as a place holder.

Hund Thous | Ten Thous | Thousands | Hundreds | Tens | Ones

2 Write the value for each coloured digit.
a 394 128 b 726 403 c 152 776 d 430 275
e 863 410 f 507 395 g 483 721 h 273 496

3 Write the numeral for:
a 100 000 + 40 000 + 7000 + 600 + 20 + 4
b 400 000 + 90 000 + 6000 + 500 + 30 + 9
c 800 000 + 60 000 + 9000 + 300 + 70 + 6
d 200 000 + 70 000 + 5000 + 400 + 6
e 1000 tens f 1000 hundreds

A salary of $87K means a salary of $87 000.

999 999 + 1 = 1 000 000 (one million)

Whole Numbers 1: Recognise, represent and order numbers to at least tens of millions. Outcomes: MA3-1WM, MA3-4NA

1

Answers

1

	HThous	TThous	Thous	Hunds	Tens	Ones
a	3	4	6	9	7	5
b	5	2	3	4	8	2
c	7	1	6	8	5	9
d	6	7	8	9	6	0
e	2	5	1	6	0	3

2 a 4 thousands b 6 thousands c 7 tens
d 3 tens of thousands e 3 thousands f 5 ones
g 4 hundreds of thousands h 3 thousands

3 a 147 624
b 496 539
c 869 376
d 275 406
e 10 000
f 100 000

1:02 Numbers Above One Million

Content strand: Number and Algebra

Substrand: Whole Numbers 1

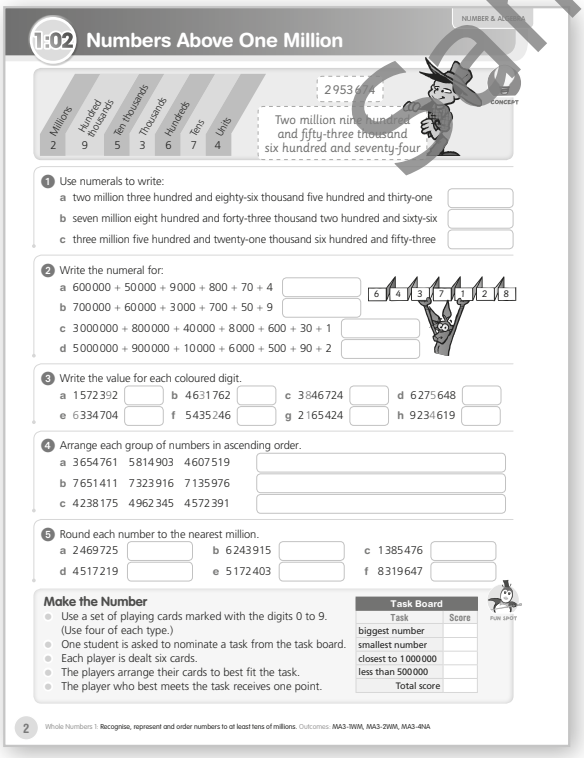
Content statements:

- Recognise, represent and order numbers to at least tens of millions.

Outcomes: MA3-1WM, MA3-2WM, MA3-4NA

Teaching Suggestions

- Answer Questions 1–4 on **ID Card 1** (p. 193).
- Use an abacus and/or numeral expander (or use the tools on the IWB DVD) to demonstrate numbers above one million.
- Provide students with frequent opportunities to read and write numbers above 1 000 000 presented orally.
- Revise expanded notation, e.g. 862 439 is 800 000 + 60 000 + 2 000 + 400 + 30 + 9.
- Remind students of place-value relationships, i.e. 10 thousand = 100 hundreds = 1 000 tens = 10 000 ones.
- Emphasise that when writing one million, there are six zeros.
- Discuss the terms 'ascending order' (increasing in size) and 'descending order' (decreasing in size) and relate the correct term to Question 3.
- Suggest a series of 5-digit and 6-digit numbers and have students write 'up' or 'down' to round numbers to the nearest 10 thousand, 100 thousand or million. Ask students to discuss and explain their results.
- Use the example questions on the IWB DVD.


1:02 Numbers Above One Million

NUMBER & ALGEBRA

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
2	9	5	3	6	7	4

2 953 674

Two million nine hundred and fifty-three thousand six hundred and seventy-four

CONCEPT

1 Use numerals to write:
a two million three hundred and eighty-six thousand five hundred and thirty-one
b seven million eight hundred and forty-three thousand two hundred and sixty-six
c three million five hundred and twenty-one thousand six hundred and fifty-three

2 Write the numeral for:
a 600 000 + 50 000 + 9 000 + 800 + 70 + 4
b 700 000 + 60 000 + 3 000 + 700 + 50 + 9
c 3 000 000 + 800 000 + 40 000 + 8 000 + 600 + 30 + 1
d 5 000 000 + 900 000 + 10 000 + 6 000 + 500 + 90 + 2

6 4 3 7 1 2 8

3 Write the value for each coloured digit.
a 1 572 392 b 4 631 762 c 3 846 724 d 6 275 648
e 6 334 704 f 5 435 246 g 2 165 424 h 9 234 619

4 Arrange each group of numbers in ascending order.
a 3 654 761 5 814 903 4 607 519
b 7 651 411 7 323 916 7 135 976
c 4 238 175 4 962 345 4 572 391

5 Round each number to the nearest million.
a 2 469 725 b 6 243 915 c 1 385 476
d 4 517 219 e 5 172 403 f 8 319 647

FUN SPOT

Make the Task
- Use a set of playing cards marked with the digits 0 to 9. (Use four of each type.)
- One student is asked to nominate a task from the task board.
- Each player is dealt six cards.
- The players arrange their cards to best fit the task.
- The player who best meets the task receives one point.

Task Board	
Task	Score
biggest number	
smallest number	
closest to 1 000 000	
less than 500 000	
Total score	

2 Whole Numbers 1 Recognise, represent and order numbers to at least tens of millions. Outcomes: MA3-1WM, MA3-2WM, MA3-4NA

Fun Spot

- Allow the students to work in groups.
- Students take turns to nominate the task. All students participate in arranging their cards to comply with the nominated task.
- The place value of a digit is the value of the column in which it is placed.
- The value of a digit is the product of the digit and its place value.

Language

numeral, expanded notation, powers of ten, place value, millions, tens of thousands, hundreds of thousands, thousands, hundreds, tens, units, abacus, numeral expander, value, digit, ascending order, descending order, round to

Resources

- abacus
- numeral expanders
- playing cards marked 0 to 9
- ID Card 1, p. 193
- IWB DVD 5

Cross-reference

See also: pp. 1, 3
Year 4 p. 29
Year 6 p. 1

Evaluation

Is the student able to do the following?

- read and write numbers above 1 000 000 using place value
- record numbers in expanded notation or powers of ten

Sample Pages

Answers

1 a 2 386 531
b 7 843 266
c 3 521 653

2 a 659 874
b 763 759
c 3 848 631
d 5 916 592

3 a 9 tens
b 3 tens of thousands
c 8 hundreds of thousands
d 5 thousands
e 6 millions
f 2 hundreds
g 1 hundreds of thousands
h 4 thousands

4 a 3 654 761; 4 607 519; 5 814 903
b 7 135 976; 7 323 916; 7 651 411
c 4 238 175; 4 572 391; 4 962 345

5 a 2 000 000 b 6 000 000 c 1 000 000
d 5 000 000 e 5 000 000 f 8 000 000

1:03 Using Large Numbers

Content strand: Number and Algebra

Substrand: Whole Numbers 1

Content statements:

- Recognise, represent and order numbers to at least tens of millions.

Outcomes: MA3-1WM, MA3-2WM, MA3-4NA

Teaching Suggestions

- Review the reading of 7-digit numbers; e.g. 3 475 040 is 'three million, four hundred and seventy-five thousand and forty'. Explain the 'and' is used to express the last two digits. Also, '3 475 647' would be read as 'three million, four hundred and seventy-five thousand, six hundred and forty-seven'. Discuss how these numbers are written in expanded notation.
- Terms relating to digits within a number can be confusing. The place value of the 7 in 3 475 040 is 10 000 or ten-thousands, as 'place value' describes the value of the column in which the numeral is found. In the Signpost series, we usually use the term 'value' of a digit. The value of the 7 is 70 000.
- Discuss the convention of leaving a space after the millions digit and the thousands digit to make the numeral easier to read. Reading large numbers correctly is extremely important on cheques and in other places where large numbers may be written. In these instances and in others, many people choose to use commas instead of spaces. Virtually every large business in Australia uses commas when writing very large numbers. Note that publishers generally do not leave a space within a 4-digit number.
- Review the rounding of numbers to the nearest million and the use of K to denote thousands; e.g. $350K for $350 000.
- Practise partitioning of large numbers so that the first part is rounded conveniently; e.g. 167 000 = 100 000 + 67 000 or 167 000 = 150 000 + 17 000.

ICT

- Ask students to find examples of large numbers on the internet, or any other source that uses large numbers, and to interpret this information.

Extension Work

- Extend the concepts introduced in this lesson to 10-digit numbers (billions).

Language

expanded notation, rounding, round to, figure, numeral, partitioning, doubling, ones, tens, hundreds, thousands, million, K (thousands), 7-digit numbers, place value, value, convention, leaving a space, comma, cheque

Resources

- place-value flip book
- a cheque for display
- IWB DVD 5

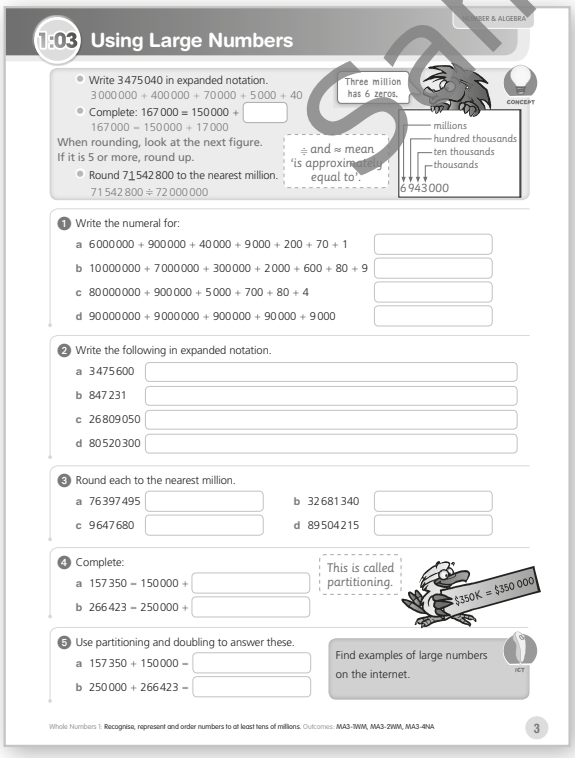
Cross-reference

See also: pp. 1, 2
Year 4 p. 29
Year 6 p. 1

Evaluation

Is the student able to do the following?

- express 7-digit numbers in words and in expanded form
- round numbers to the nearest million
- partition large numbers to help in calculations


1:03 Using Large Numbers

Write 3 475 040 in expanded notation.
3 000 000 + 400 000 + 70 000 + 5 000 + 40

Complete: 167 000 = 150 000 + ☐
167 000 = 150 000 + 17 000

When rounding, look at the next figure.
If it is 5 or more, round up.

Round 71 542 800 to the nearest million.
71 542 800 ≈ 72 000 000

≈ and ≈ mean 'is approximately equal to'.

Three million has 6 zeros.

CONCEPT

millions
hundred thousands
ten thousands
thousands
6 943 000

1 Write the numeral for:
a 6 000 000 + 900 000 + 40 000 + 9 000 + 200 + 70 + 1
b 10 000 000 + 7 000 000 + 300 000 + 2 000 + 600 + 80 + 9
c 80 000 000 + 900 000 + 5 000 + 700 + 80 + 4
d 90 000 000 + 9 000 000 + 900 000 + 90 000 + 9 000

2 Write the following in expanded notation.
a 3 475 600
b 847 231
c 26 809 050
d 80 520 300

3 Round each to the nearest million.
a 76 397 495
b 32 681 340
c 9 647 680
d 89 504 215

4 Complete:
a 157 350 = 150 000 +
b 266 423 = 250 000 +

This is called partitioning.

$350K = $350 000

5 Use partitioning and doubling to answer these.
a 157 350 + 150 000 =
b 250 000 + 266 423 =

Find examples of large numbers on the internet.

ICT

Whole Numbers 1: Recognise, represent and order numbers to at least tens of millions. Outcomes: MA3-1WM, MA3-2WM, MA3-4NA

3

Answers

1 a 6 949 271 b 17 302 689
c 80 905 784 d 99 999 000

2 a 3 000 000 + 400 000 + 70 000 + 5 000 + 600
b 800 000 + 40 000 + 7 000 + 200 + 30 + 1
c 20 000 000 + 6 000 000 + 800 000 + 9 000 + 50
d 80 000 000 + 500 000 + 20 000 + 300

3 a 76 000 000 b 33 000 000
c 10 000 000 d 90 000 000

4 a 7 350 b 16 423

5 a 307 350 b 516 423

Sample Pages

1:04 Hundredths

Content strand: Number and Algebra

Substrand: Fractions and Decimals 1

Content statements:

- Compare and order common unit fractions and locate and represent them on a number line.

Outcomes: MA3-1WM, MA3-7NA

Teaching Suggestions

- Read the hundred square as a number out of 100, e.g. 78 out of 100 is also 0·78. Use the hundred chart tool on the IWB DVD.
- Discuss the fraction wall in Question 2 to compare the relative size and/or equivalence of fractions.
- Discuss the Concept box. Introduce the terms 'proper fraction' and 'improper fraction'.
  - A proper fraction has a number that is smaller than its denominator
  - An improper fraction has a number that is greater than its denominator.
- Relate fractions to decimals. Use hundred squares and place-value blocks (**BLM 1**, p. 200) to demonstrate equivalence between decimals and fractions.
- Discuss the position of the tenths and hundredths column; i.e. to the left of the decimal point.
- Discuss the concept of zero as a place-holder when writing decimals from 0·01 to 0·09 and its effect if the zero is not included.
- Use numeral cards to label fractions in as many ways as possible.
- Note: in many Asian languages (e.g. Chinese, Japanese) the denominator is said before the numerator.
- Use the example questions on the IWB DVD.

Extension Work

- Working in small groups, have students create a set of playing cards representing hundredths by using different names, e.g. $\frac{25}{100}$, 25 out of 100 and 0·25.

  They can use the cards to play familiar games like *Fish, Old Maid* etc.

Language

fraction, decimal, hundredth, tenth, decimal point, zero, whole, denominator, numerator, proper fraction, improper fraction, smaller than, greater than, 25 out of 100, diagram

Resources

- numeral cards
- hundred squares
- place-value blocks (**BLM 1**, p. 200)
- IWB DVD 5

Cross-reference

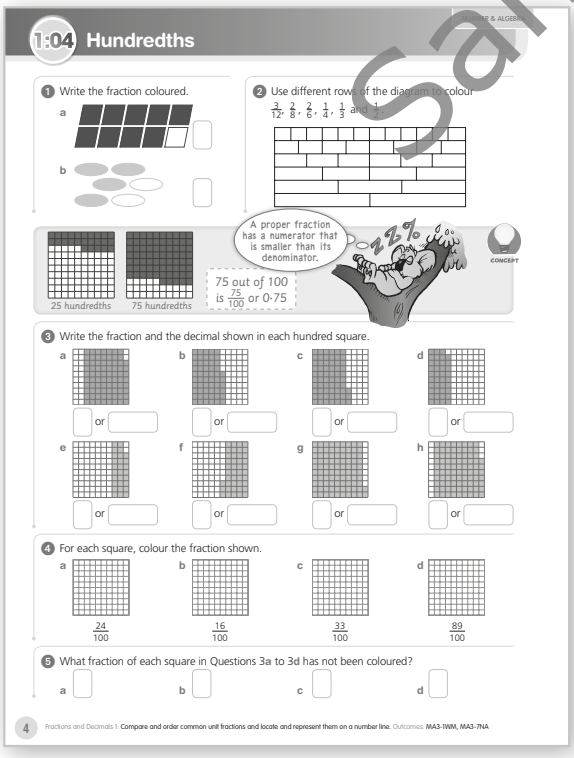
See also: pp. 7, 8, 9, 10, 11, 12, 13, 18, 19, 20
Year 4 p. 26
Year 6 p. 4

Evaluation

Is the student able to do the following?

- recognise decimals in everyday situations
- relate a common fraction to a decimal

Sample pages


1:04 Hundredths

1 Write the fraction coloured.
a
b

2 Use different rows of the diagram to colour $\frac{3}{12}$, $\frac{2}{8}$, $\frac{2}{6}$, $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$.

A proper fraction has a numerator that is smaller than its denominator.

CONCEPT

25 hundredths
75 hundredths
75 out of 100 is $\frac{75}{100}$ or 0·75

3 Write the fraction and the decimal shown in each hundred square.
a b c d
or
e f g h
or

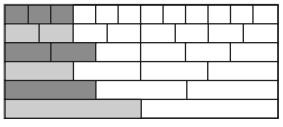
4 For each square, colour the fraction shown.
a $\frac{24}{100}$ b $\frac{16}{100}$ c $\frac{33}{100}$ d $\frac{89}{100}$

5 What fraction of each square in Questions 3a to 3d has not been coloured?
a b c d

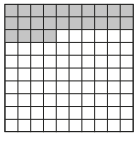
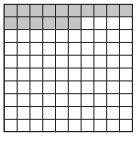
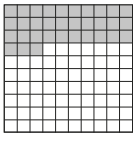
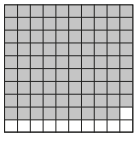
4 Fractions and Decimals 1: Compare and order common unit fractions and locate and represent them on a number line. Outcomes: MA3-1WM, MA3-7NA

Answers

1 a $\frac{9}{10}$ b $\frac{4}{6}$

2 

3 a $\frac{78}{100}$ or 0·78 b $\frac{56}{100}$ or 0·56 c $\frac{63}{100}$ or 0·63
d $\frac{39}{100}$ or 0·39 e $\frac{28}{100}$ or 0·28 f $\frac{43}{100}$ or 0·43
g $\frac{92}{100}$ or 0·92 h $\frac{87}{100}$ or 0·87

4 a  b 
c  d 

5 a $\frac{22}{100}$ b $\frac{44}{100}$ c $\frac{37}{100}$ d $\frac{61}{100}$

1:05 Fractions

Content strand: Number and Algebra

Substrand: Fractions and Decimals 1

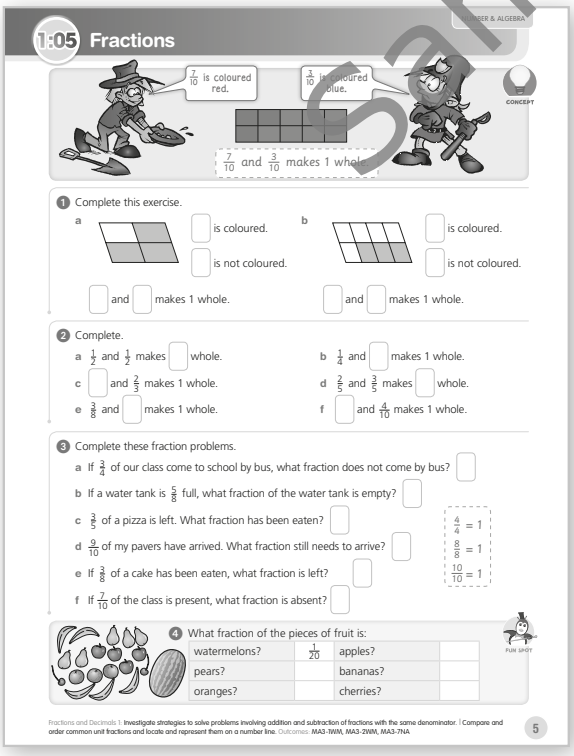
Content statements:

- Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator.
- Compare and order common unit fractions and locate and represent them on a number line.

Outcomes: MA3-1WM, MA3-2WM, MA3-7NA

Teaching Suggestions

- Revise the concept of a fraction expressed in the form $\frac{a}{b}$ where a is the number of equal fraction parts and b is the number of equal parts into which the whole has been divided.
- Revise the use of the terms 'numerator' (top number) and 'denominator' (bottom number).
- Discuss equivalent fractions and provide frequent opportunities for students to draw diagrams or use number lines to find equivalent fractions for a given fraction.
- Use Cuisenaire rods to demonstrate combinations of fractions to make 1 whole, e.g. a tan rod and a red rod makes an orange rod. An orange rod will be 1 whole if a white rod equals $\frac{1}{10}$.
- Note: $\frac{8}{10} + \frac{2}{10} = \frac{10}{10} = 1$ whole.


1:05 Fractions

NUMBER & ALGEBRA

$\frac{7}{10}$ is coloured red.

$\frac{3}{10}$ is coloured blue.

CONCEPT

$\frac{7}{10}$ and $\frac{3}{10}$ makes 1 whole.

1 Complete this exercise.

a [ ] is coloured. [ ] is not coloured. [ ] and [ ] makes 1 whole.

b [ ] is coloured. [ ] is not coloured. [ ] and [ ] makes 1 whole.

2 Complete.

a $\frac{1}{2}$ and $\frac{1}{2}$ makes [ ] whole.

b $\frac{1}{4}$ and [ ] makes 1 whole.

c [ ] and $\frac{2}{3}$ makes 1 whole.

d $\frac{2}{5}$ and $\frac{3}{5}$ makes [ ] whole.

e $\frac{3}{8}$ and [ ] makes 1 whole.

f [ ] and $\frac{4}{10}$ makes 1 whole.

3 Complete these fraction problems.

a If $\frac{3}{4}$ of our class come to school by bus, what fraction does not come by bus? [ ]

b If a water tank is $\frac{5}{8}$ full, what fraction of the water tank is empty? [ ]

c $\frac{3}{5}$ of a pizza is left. What fraction has been eaten? [ ]

d $\frac{9}{10}$ of my pavers have arrived. What fraction still needs to arrive? [ ]

e If $\frac{3}{8}$ of a cake has been eaten, what fraction is left? [ ]

f If $\frac{7}{10}$ of the class is present, what fraction is absent? [ ]

$\frac{4}{4} = 1$ $\frac{8}{8} = 1$ $\frac{10}{10} = 1$

4 What fraction of the pieces of fruit is:

watermelons?	$\frac{1}{20}$	apples?	
pears?		bananas?	
oranges?		cherries?	

FUN SPOT

Fractions and Decimals 1: Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator. | Compare and order common unit fractions and locate and represent them on a number line. Outcomes: MA3-1WM, MA3-2WM, MA3-7NA

5

- Ask students to draw their own diagrams and devise word problems for the questions in part 2. This will provide a sound base for later lessons.
- Note: in many Asian languages (e.g. Chinese, Japanese) the denominator is said before the numerator.
- Play the memory match game on the IWB DVD.

Fun Spot

- Encourage students to count the number of pieces of fruit first, and then express the number of that fruit over the total; e.g. the watermelon fraction will be written as $\frac{1}{20}$ (one piece out of the twenty pieces of fruit).

Extension Work

- On 5 mm grid paper (**BLM 22**, p. 221) draw number lines to show equivalent fractions for fifths and tenths, quarters and eighths, and thirds and sixths.

Language

fraction, numerator, denominator, equivalent fraction, half, quarter, eighth, fifth, tenth, third, sixth, twelfth, number line, fraction problem, whole number, whole

Resources

- Cuisenaire rods
- 5 mm grid paper (**BLM 22**, p. 221)
- IWB DVD 5

Cross-reference

See also: pp. 4, 6, 14, 15, 16, 17, 20, 21
Year 4 p. 21
Year 6 p. 10

Evaluation

Is the student able to do the following?

- model, compare and represent commonly used fractions
- find equivalence between thirds, sixths and twelfths

Answers

1 a $\frac{3}{4}$, $\frac{1}{4}$. $\frac{3}{4}$ and $\frac{1}{4}$ makes 1 whole.
b $\frac{3}{8}$, $\frac{5}{8}$. $\frac{3}{8}$ and $\frac{5}{8}$ makes 1 whole.

2 a 1 b $\frac{3}{4}$
c $\frac{1}{3}$ d 1
e $\frac{5}{8}$ f $\frac{6}{10}$

3 a $\frac{1}{4}$
b $\frac{3}{8}$
c $\frac{2}{5}$
d $\frac{1}{10}$
e $\frac{5}{8}$
f $\frac{3}{10}$

4 watermelons $\frac{1}{20}$; apples $\frac{4}{20}$; pears $\frac{5}{20}$; bananas $\frac{5}{20}$; oranges $\frac{3}{20}$; cherries $\frac{2}{20}$

Sample Pages

1:06 Unit Fractions

Content strand: Number and Algebra

Substrand: Fractions and Decimals 1

Content statements:

- Compare and order common unit fractions and locate and represent them on a number line.

Outcomes: MA3-1WM, MA3-7NA

Teaching Suggestions

- Unit fractions have a numerator of 1; e.g. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$.
- Discuss the fact that unit fractions can be located on a number line by dividing the space between 0 and 1 into equal parts.
- Revise the greater than (>) and less than (<) signs so students can complete Question 1.
- Emphasise that fractions can be ordered on a number line even though the denominators may be different. Refer to the number line in the Concept box.
- Students may use Cuisenaire rods to assist their understanding of smaller and larger unit fractions by placing one white rod on other rods. This may help to determine the order of unit fractions.
- Discuss the parts in the shapes in Question 3 and the fractions written next to each. Note the fact that for unit fractions, the greater the denominator, the smaller the fraction.
- Note: in many Asian languages (e.g. Chinese, Japanese) the denominator is said before the numerator.

Extension Work

- Students can use Cuisenaire rods to create their own unit fraction patterns.
- Use number lines (**BLM 17**, p. 216) to record the fraction patterns made in the above activity.

Language

unit fraction, equals, is equal to, total, makes, combine, located, number line, position, dots, greater than, less than, order, denominator, Cuisenaire rods

Resources

- Cuisenaire rods
- number lines (**BLM 17**, p. 216)
- IWB DVD 5

Cross-reference

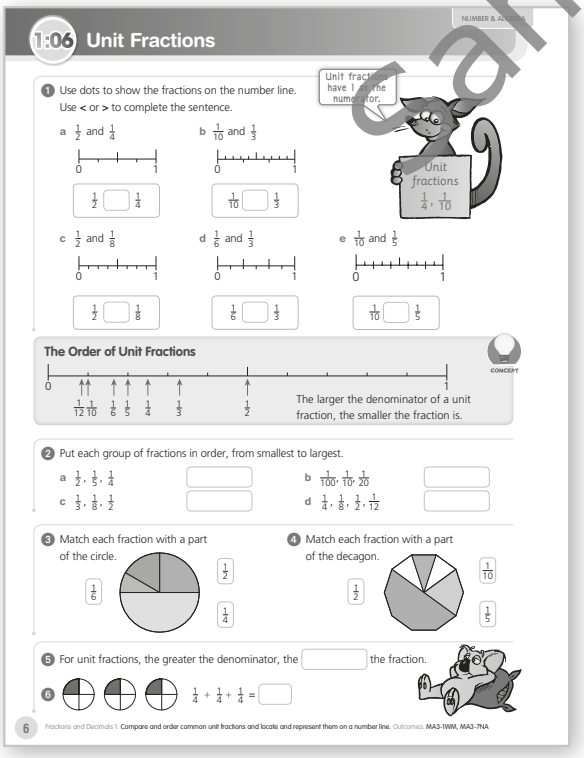
See also: pp. 4, 5, 14, 15, 16, 17, 20, 21
Year 4 p. 21
Year 6 p. 10

Evaluation

Is the student able to do the following?

- compare and order common unit fractions
- locate and represent common unit fractions on a number line

Sample pages


1:06 Unit Fractions

1 Use dots to show the fractions on the number line. Use < or > to complete the sentence.

a $\frac{1}{2}$ and $\frac{1}{4}$ b $\frac{1}{10}$ and $\frac{1}{3}$ c $\frac{1}{2}$ and $\frac{1}{8}$ d $\frac{1}{6}$ and $\frac{1}{3}$ e $\frac{1}{10}$ and $\frac{1}{5}$

Unit fractions have 1 as the numerator.

Unit fractions $\frac{1}{4}$, $\frac{1}{10}$

The Order of Unit Fractions

CONCEPT

The larger the denominator of a unit fraction, the smaller the fraction is.

2 Put each group of fractions in order, from smallest to largest.

a $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{4}$ b $\frac{1}{100}$, $\frac{1}{10}$, $\frac{1}{20}$ c $\frac{1}{3}$, $\frac{1}{8}$, $\frac{1}{2}$ d $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{2}$, $\frac{1}{12}$

3 Match each fraction with a part of the circle.

4 Match each fraction with a part of the decagon.

5 For unit fractions, the greater the denominator, the ☐ the fraction.

6 $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} =$ ☐

6 Fractions and Decimals 1 Compare and order common unit fractions and locate and represent them on a number line. Outcomes: MA3-1WM, MA3-7NA

Answers

1 a $\frac{1}{2} > \frac{1}{4}$ b $\frac{1}{10} < \frac{1}{3}$ c $\frac{1}{2} > \frac{1}{8}$ d $\frac{1}{6} < \frac{1}{3}$ e $\frac{1}{10} < \frac{1}{5}$

2 a $\frac{1}{5}$, $\frac{1}{4}$, $\frac{1}{2}$ b $\frac{1}{100}$, $\frac{1}{20}$, $\frac{1}{10}$ c $\frac{1}{8}$, $\frac{1}{3}$, $\frac{1}{2}$ d $\frac{1}{12}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$

3 $\frac{1}{6}$, $\frac{1}{2}$, $\frac{1}{4}$

4 $\frac{1}{2}$, $\frac{1}{10}$, $\frac{1}{5}$

5 smaller

6 $\frac{3}{4}$

1:07 Tenths

Content strand: Number and Algebra

Substrand: Fractions and Decimals 1

Content statements:

- Compare, order and represent decimals.
- Compare and order common unit fractions and locate and represent them on a number line.

Substrand: Fractions and Decimals 2

Content statements:

- Make connections between equivalent fractions, decimals and percentages.

Outcomes: MA3-1WM, MA3-7NA

Teaching Suggestions

- Use place-value blocks (**BLM 1**, p. 200) to model tenths, including whole numbers.
- By placing 7 ones on top of 1 ten, we can model $\frac{7}{10}$ or 0·7. This can also be modelled by placing 7 tens on top of 1 hundred.
- Use place-value cards (**BLM 3**, p. 202) to demonstrate the place value of decimal fractions.
- Note the 'th' at the end of the word 'tenth' and its position in relation to the decimal point. Clarify the difference between 'tenths' and 'tens'.
- In Question 4, practise counting by fractions and decimals.

Extension Work

- Play *Bingo*. The 'caller' says a fraction, and the students mark off the respective decimal.
- Encourage students to play Concentration using fractions and decimals.

Language

fraction, decimal, decimal point, decimal number, whole, tenth, column, one point three …, number line, empty number line

Resources

- place-value blocks (**BLM 1**, p. 200)
- place-value cards (**BLM 3**, p. 202)
- IWB DVD 5

Cross-reference

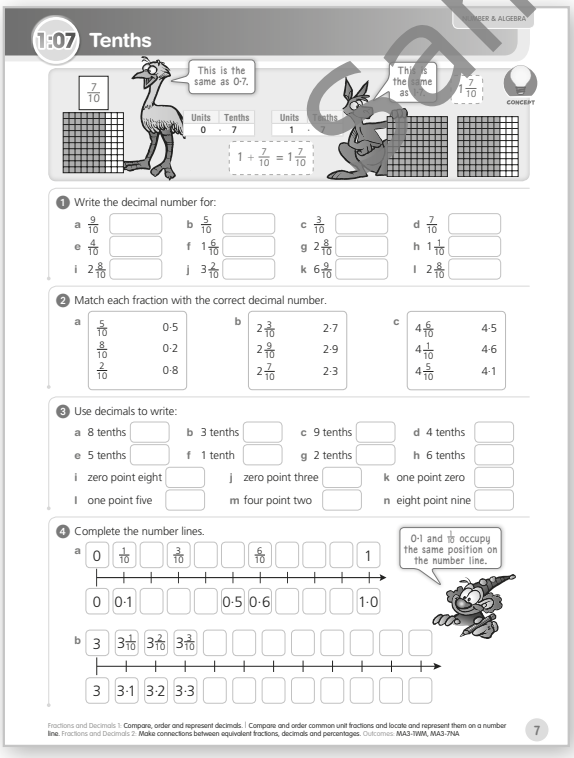
See also: pp. 4, 8, 9, 10, 11, 12, 13, 18, 19, 20
Year 4 p. 26
Year 6 p. 6

Evaluation

Is the student able to do the following?

- model, compare and represent decimals to one decimal place
- add and subtract decimals with the same number of decimal places

sample pages



Answers

1 **a** 0·9 **b** 0·5 **c** 0·3 **d** 0·7 **e** 0·4 **f** 1·6
g 2·8 **h** 1·1 **i** 2·8 **j** 3·2 **k** 6·9 **l** 2·8

2 **a** $\frac{5}{10}$ — 0·5; $\frac{8}{10}$ — 0·2; $\frac{2}{10}$ — 0·8
b $2\frac{3}{10}$ — 2·3; $2\frac{9}{10}$ — 2·9; $2\frac{7}{10}$ — 2·7
c $4\frac{6}{10}$ — 4·6; $4\frac{1}{10}$ — 4·1; $4\frac{5}{10}$ — 4·5

3 **a** 0·8 **b** 0·3 **c** 0·9 **d** 0·4 **e** 0·5
f 0·1 **g** 0·2 **h** 0·6 **i** 0·8 **j** 0·3
k 1·0 **l** 1·5 **m** 4·2 **n** 8·9

4 **a** 0, $\frac{1}{10}$, $\frac{2}{10}$, $\frac{3}{10}$, $\frac{4}{10}$, $\frac{5}{10}$, $\frac{6}{10}$, $\frac{7}{10}$, $\frac{8}{10}$, $\frac{9}{10}$, 1
0, 0·1, 0·2, 0·3, 0·4, 0·5, 0·6, 0·7, 0·8, 0·9, 1·0

b 3, $3\frac{1}{10}$, $3\frac{2}{10}$, $3\frac{3}{10}$, $3\frac{4}{10}$, $3\frac{5}{10}$, $3\frac{6}{10}$, $3\frac{7}{10}$, $3\frac{8}{10}$, $3\frac{9}{10}$, 4, $4\frac{1}{10}$
3, 3·1, 3·2, 3·3, 3·4, 3·5, 3·6, 3·7, 3·8, 3·9, 4·0, 4·1

1:08 Decimals

Content strand: Number and Algebra
Substrand: Fractions and Decimals 1
Content statements:

- Compare, order and represent decimals.

Outcomes: MA3-1WM, MA3-7NA

Teaching Suggestions

- Discuss the concept shown in the Concept box, i.e. the equivalence of 82 out of 100 to 0·82 and $\frac{82}{100}$. They can be used freely as alternatives when naming a fraction.
- Discuss the use of the decimal point and its position above the line (although there is a publishing convention to place it on the line).
- Emphasise the relationship of decimals to money. Students may need to be reminded that \$0.17 or 17 cents is $\frac{17}{100}$ of one dollar.
- Discuss the use of the zero as a place-holder before the decimal point. (It indicates that there are no whole numbers being used.)
- Use fraction labels (**BLM 4**, p. 203) to name the fractions in as many ways as possible. Display this on a chart.
- Encourage students to practise writing and locating decimals on a number line. Students could use additional number lines (**BLM 17**, p. 216) to plot and order decimals.
- Encourage students to practise counting using decimals.
- Remind students of the correct reading of a decimal; e.g. 1·35 is read as 'one point three five', not 'one point thirty-five'.

Extension Work

- Have students use place-value materials to model each fraction shown in Question 4.
- Ask students to name each fraction shown in Question 4.

Language

whole, fraction, tenth, 82 out of 100, $\frac{82}{100}$, 0·82, decimal, numerator, denominator, one hundredth, two hundredths … one hundred hundredths

Resources

- place-value materials
- fraction labels (**BLM 4**, p. 203)
- number lines (**BLM 17**, p. 216)
- IWB DVD 5

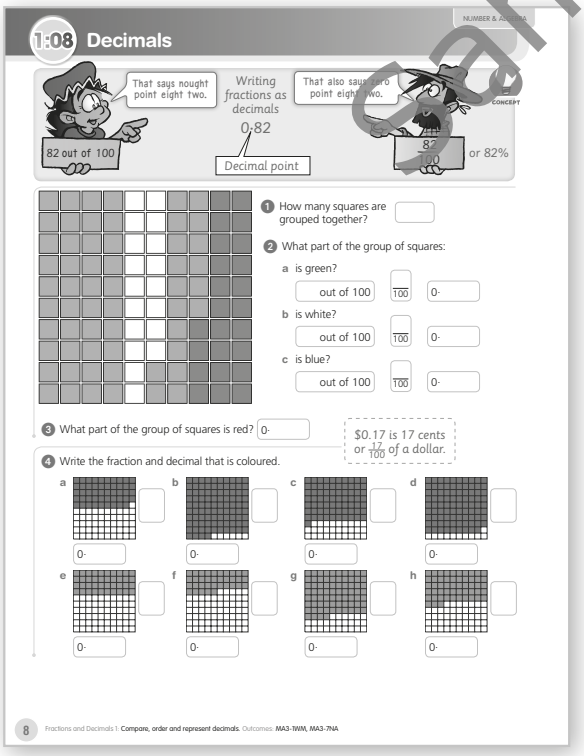
Cross-reference

See also: pp. 4, 7, 9, 10, 11, 12, 13, 18, 19, 20
Year 4 p. 25
Year 6 p. 11

Evaluation

Is the student able to do the following?

- model, compare and represent fractions with denominators 10 and 100
- model, compare and represent decimals to two decimal places


1:08 Decimals

That says nought point eight two.

Writing fractions as decimals

0·82

Decimal point

That also says nought point eight two.

82 out of 100

$\frac{82}{100}$ or 82%

1 How many squares are grouped together?

2 What part of the group of squares:

a is green? out of 100 $\frac{}{100}$ 0·

b is white? out of 100 $\frac{}{100}$ 0·

c is blue? out of 100 $\frac{}{100}$ 0·

3 What part of the group of squares is red? 0·

\$0.17 is 17 cents or $\frac{17}{100}$ of a dollar.

4 Write the fraction and decimal that is coloured.

a 0· b 0· c 0· d 0·

e 0· f 0· g 0· h 0·

8 Fractions and Decimals 1 Compare, order and represent decimals. Outcomes: MA3-1WM, MA3-7NA

Answers

1. 100
2. a 40 out of 100, $\frac{40}{100}$, 0·40 or 0·4
   b 18 out of 100, $\frac{18}{100}$, 0·18
   c 18 out of 100, $\frac{18}{100}$, 0·18
3. 0·24
4. a 0·49, $\frac{49}{100}$ b 0·94, $\frac{94}{100}$ c 0·71, $\frac{71}{100}$ d 0·89, $\frac{89}{100}$
   e 0·40, $\frac{40}{100}$ f 0·35, $\frac{35}{100}$ g 0·74, $\frac{74}{100}$ h 0·53, $\frac{53}{100}$

Sample Pages

1:09 Place Value in Decimals

Content strand: Number and Algebra
Substrand: Fractions and Decimals 1
Content statements:
- Compare, order and represent decimals.

Outcomes: MA3-1WM, MA3-7NA

Teaching Suggestions

- Use place-value materials to model the concept shown in the Concept box. Use place-value cards (**BLM 3**, p. 202) and numeral expanders (**BLM 2**, p. 201), or use the tools on the IWB DVD, to demonstrate the value of each digit.
- Be aware of the fact that students may experience difficulty understanding the pictures of decimals using place-value blocks. Students must realise that we are actually comparing the number of ones in the top layer with the 100 ones that make up the bottom layer.
- It is important to note that in Question 2, a whole number is being introduced. Here the flat (hundred block) is completely covered to represent 1 whole.
- Discuss the use of the zero as a place-holder in the decimal 0·27 (which has no whole number) and 0·08.
- Model decimals with whole numbers, e.g. 1·27, and discuss the place value of each digit.
- Use labels to name the decimals in as many different ways as possible. Display on a class chart.

Extension Work

- Place these decimals on a number line from smallest to largest:
  0·23, 1·74, 1·18, 0·86, 0·37, 1·48, 0·55, 1·92

Language

whole, fraction, tenth, hundredth, 27 out of 100, $\frac{27}{100}$, 0·27, denominator, numerator, place value, decimal, one hundredth, two hundredths … one hundred hundredths, label, model, numeral expander

Resources

- place-value materials
- number lines
- numeral expanders (**BLM 2**, p. 201)
- place-value cards (**BLM 3**, p. 202)
- IWB DVD 5

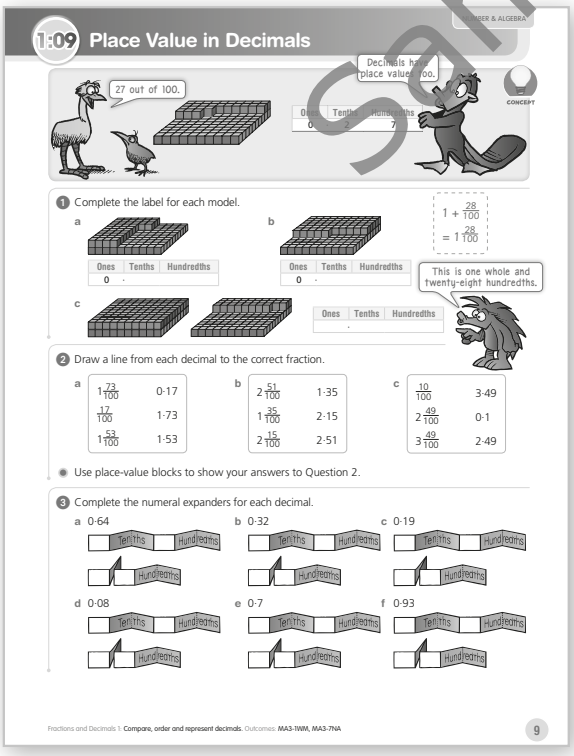
Cross-reference

See also: pp. 4, 7, 8, 10, 11, 12, 13, 18, 19, 20
Year 4 p. 25
Year 6 p. 4

Evaluation

Is the student able to do the following?
- model, compare and represent fractions with denominators 10 and 100
- model, compare and represent decimals to two decimal places

Sample Pages



Answers

1

a

Ones	Tenths	Hundredths
0	· 4	6

b

Ones	Tenths	Hundredths
0	· 5	5

c

Ones	Tenths	Hundredths
1	· 2	8

2

a $1\frac{73}{100}$ — 0·17; $\frac{17}{100}$ — 1·73; $1\frac{53}{100}$ — 1·53

b $2\frac{51}{100}$ — 1·35; $1\frac{35}{100}$ — 2·15; $2\frac{15}{100}$ — 2·51

c $\frac{10}{100}$ — 3·49; $2\frac{49}{100}$ — 0·1; $3\frac{49}{100}$ — 2·49

3

a 6 Tenths 4 Hundredths = 6 4 Hundredths

b 3 Tenths 2 Hundredths = 3 2 Hundredths

c 1 Tenths 9 Hundredths = 1 9 Hundredths

d 0 Tenths 8 Hundredths = 0 8 Hundredths

e 7 Tenths 0 Hundredths = 7 0 Hundredths

f 9 Tenths 3 Hundredths = 9 3 Hundredths

1:10 Place Value to Thousandths

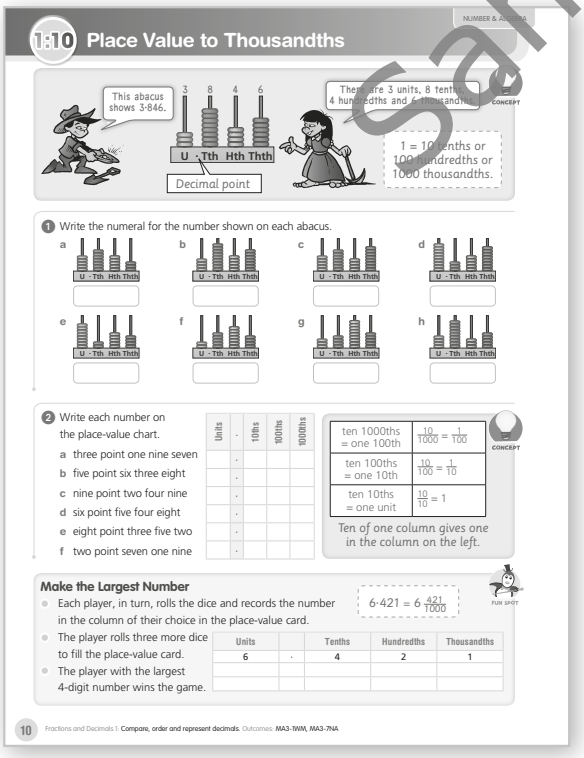
Content strand: Number and Algebra
Substrand: Fractions and Decimals 1
Content statements:

- Compare, order and represent decimals.

Outcomes: MA3-1WM, MA3-7NA

Teaching Suggestions

- Have students answer Questions 1–8 on **ID Card 1**, (p. 193).
- In this lesson, students should understand that the place-value system can be extended beyond hundredths. Emphasise the place-value relationship of decimals; i.e. 1 = 10 tenths or 100 hundredths or 1 000 thousandths.
- Discuss the 'place value' of a decimal number. It is the value of the column in which the digit lies.
- Revise the correct reading of a decimal, e.g. 1·35 is read as 'one point three five', not 'one point thirty-five'.
- Use an abacus or place-value cards (**BLM 3**, p. 202) to demonstrate the value of the digits in decimal numbers to thousandths, e.g. the value of the 6 in 2·416 is 6 thousandths ($\frac{6}{1000}$). You could use the tools on the IWB DVD.
- Decimal numbers can be written in expanded notation, e.g. 2·416 can be written as $2 + \frac{4}{10} + \frac{1}{100} + \frac{6}{1000}$.
- Revise the relationship between common fractions and decimal fractions, e.g. $\frac{4}{10}$ is 0·4, $\frac{41}{100}$ is 0·41 and $\frac{416}{1000}$ is 0·416.


1:10 Place Value to Thousandths

This abacus shows 3·846.

3 8 4 6
U · Tth Hth Thth
Decimal point

There are 3 units, 8 tenths, 4 hundredths and 6 thousandths.

1 = 10 tenths or 100 hundredths or 1000 thousandths.

1 Write the numeral for the number shown on each abacus.

a b c d e f g h

2 Write each number on the place-value chart.
a three point one nine seven
b five point six three eight
c nine point two four nine
d six point five four eight
e eight point three five two
f two point seven one nine

Units	·	10ths	100ths	1000ths

ten 1000ths = one 100th	$\frac{10}{1000} = \frac{1}{100}$
ten 100ths = one 10th	$\frac{10}{100} = \frac{1}{10}$
ten 10ths = one unit	$\frac{10}{10} = 1$

Ten of one column gives one in the column on the left.

Make the Largest Number
- Each player, in turn, rolls the dice and records the number in the column of their choice in the place-value card.
- The player rolls three more dice to fill the place-value card.
- The player with the largest 4-digit number wins the game.

6·421 = 6 $\frac{421}{1000}$

Units		Tenths	Hundredths	Thousandths
6	·	4	2	1

10 Fractions and Decimals 1: Compare, order and represent decimals. Outcomes: MA3-1WM, MA3-7NA

- Provide students with frequent opportunities to state the value of any digit in a decimal number.
- Play the drag-and-drop game on the IWB DVD.

Fun Spot

- This is a game for 4 to 6 players.
- Each number must be placed on the place-value card before the next number is rolled.

Extension Work

- Enter the following into a calculator:

  then press =
- Continue pressing = and discuss the results.

Language

fraction, decimal, decimal numbers, $\frac{416}{1000}$, 0·416, place value, decimal point, decimal places, digit, units, tenths, hundredths, thousandths, numeral, abacus, place-value chart

Resources

- abacuses
- calculators
- **ID Card 1**, p. 193
- place-value cards (**BLM 3**, p. 202)
- IWB DVD 5

Cross-reference

See also: pp. 4, 7, 8, 9, 11, 12, 13, 18, 19, 20
Year 4 p. 26
Year 6 p. 4

Evaluation

Is the student able to do the following?

- model, compare and represent commonly used fractions

Answers

1 a 5·753 b 4·957 c 5·748 d 9·358
e 8·254 f 2·574 g 3·495 h 4·935

2

	Units	·	10ths	100ths	1000ths
a	3	·	1	9	7
b	5	·	6	3	8
c	9	·	2	4	9
d	6	·	5	4	8
e	8	·	3	5	2
f	2	·	7	1	9

Sample Pages