



The Wilkie Way

NZ Curriculum Screening Assessment

Teacher Guide & Answers

Mathematical Number Knowledge & Skills

Level 2

(where student is operating between
Mid Level 1 and Early Level 3)

Odd Year

- Whole numbers
- Addition & Subtraction
- Multiplication & Division
- Fractions

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This screening assessment is designed by Charlotte Wilkinson. A private education consultant specialising in the teaching and learning of primary mathematics. (MOE Accredited ID 654)

The purpose behind the mathematical screening assessment is to find out what your students know to ensure a firm foundation for the building of further mathematical concepts.

The screening will also show up specific weak areas within the level band that will require further teaching and learning experiences.

The areas of mathematics screened in this assessment, level 2 knowledge and skills are:

Whole Numbers	Place value, naming columns, expanding numbers 10 more/10 less, grouping & sequencing, rounding, numbers.
Addition & Subtraction	Basic addition & subtraction up to 100, tens & doubles. Recall or derive facts to 7. Uses facts to 10 in other columns. At level 2 students should be able to use a simple additive strategy to add/subtract a single digit to a double digit number.
Multiplication & Division	Can name equal groups. Understands multiplication as repeated addition. Recognises an array to represent multiplication. Understands a division statement as equal grouping or equal sharing. Recalls or derives multiplication & division facts.
Fractions	Recognising half as two equal parts. Identifying a unit fraction of a shape or quantity. Writing non unit fractions. Understanding half as a counting unit, the denominator representing the size of the unit, the numerator as how many units. Fractions as a result of a division (sharing). Relationship between fractions, multiplication & division.

This screening assessment can be used to identify groups of students with common weaknesses to create targeted intervention booster groups.

Students scoring in the level 3 band should be re-screened using the Level 3 assessment screen to provide information for teaching and learning next steps.

	Mid Level 1	Upper Level 1	Early Level 2	Mid Level 2	Upper Level 2	Early Level 3
Overall Score	0 - 8	9 - 24	25 - 50	51 - 74	75 - 90	91 - 100
Whole Number PV	0 - 2	3 - 5	6 - 14	15 - 22	23 - 26	27 - 30
Add/Sub	0 - 2	3 - 7	8 - 14	15 - 22	23 - 24	25 - 26
Mult/Div	0 - 1	2 - 5	6 - 11	12 - 16	17 - 22	23 - 24
Fractions	0 - 3	4 - 7	8 - 11	12 - 14	15 - 18	19 - 20

Administering the screening assessment.

This assessment is not timed. Expect students to take around 30 - 60 minutes to complete. Sections can be completed at different times rather than taking the whole assessment screen in one go.

Students with a specific reading difficulty may have a reader. The reader may not explain, only read the words.

Students with a specific writing difficulty may have a writer. A writer records exactly what a student says.

Each page of the assessment screens for a particular area of mathematical knowledge and/or skill.

Whole number contributes 30 marks to the overall score. This section has the highest weighting as without an understanding of the number system students cannot make sense of working with numbers.

Addition/subtraction and **multiplication/division** have similar weighting of 26 for addition and subtraction and 24 for multiplication and division. This reflects the likelihood of more additive experiences.

The **fractions** section contributes 20 marks to the overall score. It looks at both partitioning regions and partitioning sets of objects. It covers understanding fraction symbols and recognising halves as counting numbers.

If a student scores low on any particular page then this indicates an area of general weakness for this student requiring further teaching and learning experiences.

Within each page, the questions target smaller items of knowledge within the particular area of mathematical knowledge. Information on each set of questions is given at the end of each section in this teacher guide. If students make consistent errors then this particular area of knowledge is weak and requires specific targeted teaching and learning practice. Teaching and learning resources for each targeted area are given. A single chapter often covers multiple areas as areas should not be taught in isolation.

A level two student should be displaying recall of some addition and subtraction facts and using them when calculating in addition and subtraction (not counting). Observe students as they are carrying out the assessment screen. Speed of completion in the addition/subtraction section is a good clue to whether students are recalling facts or counting to find the answers.

To uncover additive and multiplicative thinking, students with an overall score within level 2 knowledge should complete Section 3 or Section 4 of the Primary Maths Assessment Tool (PMAT) published by Edify (ISBN 9780947496562).

www.edify.co.nz.

Use their score within the range to determine whether to use Section Three or Section Four. The PMAT is an assessment of mathematical problem solving.

The Assessment Screen and The Primary Maths Assessment Tool (PMAT) are included in the Beagle suite of assessment tools - a cloud based solution supporting NZ schools to raise student achievement and close the gap, using assessment data to drive instruction and save time in analysing and interpreting results.

www.beagleinnovations.com

What do you know about numbers?

1. Write the value of the underlined digit in each of these numbers in words?

For example: 36 six ones

- a. 53 **five tens** b. 236 **two hundreds** c. 3527 **three thousands**
 d. 46 758 **forty thousands** e. 708 **zero tens**

2. Fully expand the following numbers. For example: 36 = 30 + 6

- a. 72 **70 + 2** b. 264 **200 + 60 + 4**
 c. 583 **500 + 80 + 3** d. 4602 **4000 + 600 + 2**

3. Write the number 10 more than each number given.

- a. 42 **52** b. 65 **75** c. 147 **157** d. 295 **305**

4. Write the number 10 less than each number given.

- a. 84 **74** b. 39 **29** c. 456 **446** d. 504 **494**

5. How many whole groups of 10 in each of these numbers?

- a. 35 **3** b. 84 **8** c. 165 **16** d. 727 **72**

6. How many whole groups of 100 in each of these numbers?

- a. 645 **6** b. 374 **3** c. 582 **5** d. 15 **0**

7. Round each number to the closest 10 (decade).

- a. 38 **40** b. 10 **10** c. 45 **50** d. 127 **130**

8. Round each number to the closest 100

- a. 364 **400** b. 789 **800**

Maximum score 30

Q1	5	Student knows column values of whole numbers (to 5 digits)
Q2	4	Student understands additive structure of number in their standard partitions.
Q3&4	8	Student understands the importance of 10 in the number system when adding and subtracting.
Q5&6	7	Student shows an understanding of the multiplicative structure of the number system, groups of ten repeatedly nesting inside groups of ten.
Q7	4	Student is able to round numbers to the closest ten (decade) with two digit numbers and understand the convention of round up when the digit 5 is involved. Can round to closest decade with a 3 digit number.
Q8	2	Student is able to round to the closest hundred.

Understanding the number system is essential in "cracking the code". Initially students require a linguistic understanding, names of numbers, names of columns. Their understanding must develop further to understand the additive partitioning and how basic addition and subtraction facts are repeated in each of the columns. A conceptual understanding requires students to understand the multiplicative nature of the number system based around repeated groups of ten. Students must also be able to see numbers in their sequential position. All aspects of place value must be developed for students to be successful in estimating and operating with numbers.

Resources for Teaching and Learning			
		Pearson Mathematics	Wilkie Way
Q1	To know column values of whole numbers (to 5 digits)	Level 1 Unit 24 Book 2a Chapter 4 Book 2b Chapter 4 Book 3a Chapter 3	Teacher Handbook: No. & The Number System Chapters 3 & 4
Q2	To develop an understand of the additive structure of number in their standard partitions.	Book 2a Chapter 10 Book 2b Chapter 2 & 4	Teacher Handbook: No. & The Number System Chapter 6
Q3 Q4	To develop an understanding of the importance of 10 in the number system when adding and subtracting.	Level 1 Unit 23 Book 2a Chapter 3 Book 2b Chapter 4	Teacher Handbook: No. & The Number System Chapter 6
Q5 Q6	To develop an understanding of the multiplicative structure of the number system, groups of ten repeatedly nesting inside groups of ten.	Book 2a Chapter 7 Book 2b Chapter 4	Teacher Handbook: No. & The Number System Chapter 9 Dice & Counter Games: Set 5
Q7	To be able to round to the closest ten (decade), with two digit numbers and understand the convention of round up when the digit 5 is involved. Can round to closest decade with a 3 digit number.	Book 2a Chapter 9 Book 2b Chapter 2	Teacher Handbook: No. & The Number System Chapter 11
Q8	To be able to round to the closest hundred.	Book 2b Chapter 9	Teacher Handbook: No. & The Number System Chapter 11

Teacher Handbook series & Dice & Counter Games are available from the online store at www.thewilkieway.co.nz

The following are available from www.thewilkieway.co.nz members content area (subscription):

Problems: To develop conceptual understanding.

Knowledge Building Activities: Place Value Worksheets & Games.

Planning & Assessment: Place Value Progression.

Practice Workbooks: Aligned to Pearson Book Chapters.

Pearson Book Chapters are referenced to MOE 'Figure it Out' books in the Pearson Mathematics Teacher Guides.

What do you know about addition and subtraction?

Complete the following equations.

1a. $5 + 2 = 7$ b. $8 + 8 = 16$ c. $10 + 5 = 15$

d. $10 - 4 = 6$ e. $17 - 7 = 10$ f. $12 - 6 = 6$

2a. $6 + 8 = 14$ b. $13 + 4 = 17$ c. $9 + 8 = 17$

d. $13 - 7 = 6$ b. $18 - 5 = 13$ c. $15 - 6 = 9$

3a. $50 + 40 = 90$ b. $70 + 60 = 130$ c. $43 + 6 = 49$

d. $80 - 30 = 50$ e. $140 - 60 = 80$ f. $78 - 5 = 73$

Solve the following equations and show how you arrived at your answer.

Students may use number lines or equations to show their thinking.

4a. $57 + 8 = 65$

$57 + 3 + 5$

$50 + 15$

$55 + 10$

b. $63 + 9 = 72$

$63 + 7 + 2$

$63 + 10 - 1$

$60 + 12$

Note:

With addition and subtracting
single digits students will
often insist in counting on
or back because it is still
easy to do.

5a. $84 - 7 = 77$

$84 - 4 - 3$

$4 - 7 = -3$ $80 - 3$

b. $94 - 9 = 85$

$94 - 4 - 5$

$94 - 9 = 85$

6a. $46 + 29 = 75$

$46 + 30 - 1$

$40 + 20 + 15$

b. $25 + 28 = 53$

$25 + 25 + 3$

$20 + 20 + 13$

$30 + 23$

7a. $78 - 19 = 59$

$78 - 10 + 1$

$78 - 19 = 59$

b. $93 - 45 = 48$

$93 - 40 - 3 - 2$

Uses $45 + 45 = 90$ $45 + 3 = 48$

Maximum Score 26

Q1	6	Student recalls basic addition & subtraction facts within 10, doubles and teens.
Q2	6	Student recalls basic addition and subtraction facts with 20, near doubles, near teens, facts using facts to 10.
Q3	6	Student uses knowledge of facts to 10 and understand they are repeated in other columns in the number system.
Q4	2	Student uses an additive strategy to add a single digit to a double digit.
Q5	2	Student uses an additive strategy to subtract a single digit from a double digit.
Q6	2	Student uses an efficient additive strategy to add double digit numbers.
Q7	2	Student uses an efficient additive strategy to subtract double digit numbers.

Students should be developing recall of basic addition and subtractions facts. Knowledge of facts to 10, teens and doubles are used to build knowledge of facts to 20. Students who stumble at questions 4 or use counting on to solve the question could be asked to explain their thinking for answers to question 2 to see if they know how to use doubles and teens to solve near doubles and teens. If you are unsure whether students are using any additive strategy or if they are reliant on counting on or back then evidence from section 3 of the Primary Mathematics Assessment Tool will be required to confirm the beginnings of additive thinking.

Resources for Teaching and Learning

		Pearson Mathematics	Wilkie Way
Q1	Practice in recall basic addition & subtraction facts within 10, doubles and teens.	Level 1 Unit 21 Book 2a Chapter 1 & 2	Teacher Handbook: Arithmetic Operations Chapter 7 Early Numeracy Games Set 6, 7, 8 Dice & Counter Games Set 3
Q2	Practice recall basic addition and subtraction facts with 20, near doubles, near teens, facts using facts to 10.	Level 1 Unit 25 Book 2a Chapter 12 & 15 Book 2b Chapter 1	Teacher Handbook: Arithmetic Operations Chapter 7 Dice & Counter Games Set 9
Q3	To use knowledge of facts to 10 and understand they are repeated in other columns in the number system.	Book 2a Chapter 9 & 10	Teacher Handbook: Arithmetic Operations Chapter 7
Q4	To use an additive strategy to add a single digit to a double digit.	Book 2a Chapter 11 & 15 Book 2b Chapter 2	
Q5	To use an additive strategy to subtract a single digit from a double digit.	Book 2a Chapter 11 & 16 Book 2b Chapter 2	
Q6	To use an efficient additive strategy to add double numbers.	Book 2a Chapter 2 Book 3a Chapter 1	Teacher Handbook: No & The Number System Chapter 12
Q7	To use an efficient additive strategy to subtract a single digit from a double digit numbers.	Book 2b Chapter 3 Book 3a Chapter 1	Teacher Handbook: No & The Number System Chapter 12

Teacher Handbook series, Early Numeracy Games, Dice & Counter Games are available from the online store at www.thewilkieway.co.nz

The following are available from www.thewilkieway.co.nz members content area (subscription):

Problems: To develop conceptual understanding.

Knowledge Building Activities: Addition & Subtraction Games.

Planning & Assessment: Addition & Subtraction Progressions.

Practice Workbooks: Aligned to Pearson Book Chapters.

Professional Learning: Powerpoint Teaching & Learning Basic Facts.

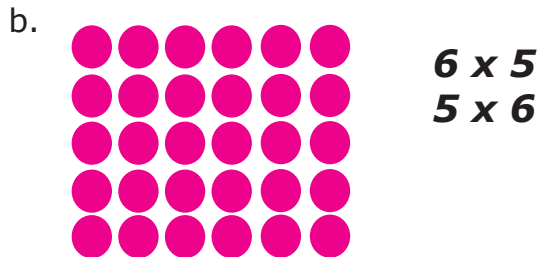
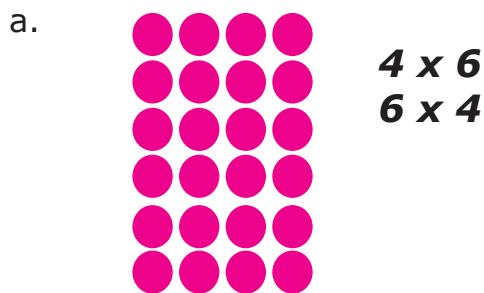
Pearson Book Chapters are referenced to MOE 'Figure it Out' books in the Pearson Mathematics Teacher Guides.

What do you know about multiplication and division?

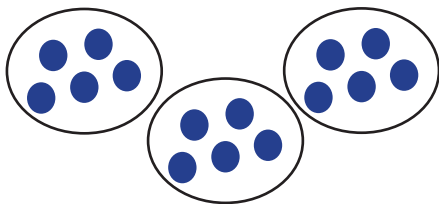
1. Picture shows 2 groups of 7 or 7 groups of 2

2a. Picture shows 4 groups of 3 b. 4×3 or 3×4

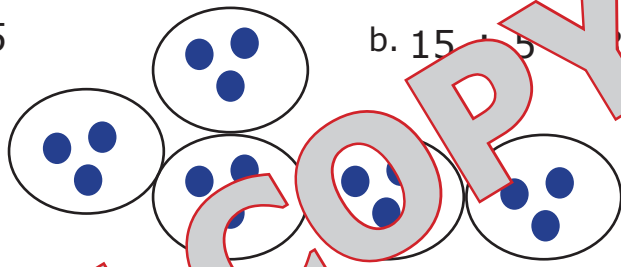
3. Write both multiplications shown by each array.



4a. Draw a picture to show $15 \div 5$



b. $15 \div 5 = 3$



15 shared between 5 or 15 divided into 5 groups of 3

Complete these equations:

5a. $7 \times 2 = 14$ b. $8 \times 5 = 40$ c. $10 \times 6 = 60$

6a. $16 \div 2 = 8$ b. $25 \div 5 = 5$ c. $70 \div 10 = 7$

7a. $6 \times 6 = 36$ b. $4 \times 8 = 32$ c. $3 \times 9 = 27$

8a. $2 \times 7 = 14$ b. $16 \times 4 = 64$ c. $14 \times 6 = 84$

9a. $36 \div 4 = 9$ b. $42 \div 7 = 6$ c. $24 \div 3 = 8$

Maximum Score 24

Q1	1	Student is able to represent an equal grouping or equal sharing.
Q2	2	Student is able to represent a repeated addition in a picture and record a repeated addition statement as a multiplication statement.
Q3	4	Student understands the array model representing the commutative property of multiplication.
Q4	2	Student understands a division statement as either an equal share or an equal group. Can complete a division equation.
Q5	3	Student recalls multiplication by 2, 5 and 10
Q6	3	Student understands division as inverse of $\times 2$, $\times 5$ or $\times 10$
Q7	3	Student knows or derives multiplication facts
Q8	3	Student applies the distributive property or doubling and halving to derive facts.
Q9	3	Student uses the inverse relationships to solve division.

Students should be demonstrating an understanding of how multiplication works rather than **just** recall of facts. Good recall of facts is essential for future mathematical learning. Question 8 will show those students developing an understanding of the properties of multiplication by using the distributive property or doubling and halving.

Resources for Teaching and Learning			
		Pearson Mathematics	Wilkie Way
Q1	To represent an equal sharing or equal grouping.	Level 1 Unit 16 Book 2a Chapter 14 Book 2b Chapter 8	Teacher Handbook: Arithmetic Operations Chapter 8
Q2	To represent a repeated addition and record a repeated addition statement as a multiplication statement.	Level 1 Unit 22 Book 2a Chapter 6, 7 & 8	Teacher Handbook: Arithmetic Operations Chapter 8
Q3	To understand the array model representing the commutative property of multiplication.	Book 2a Chapter 7	Teacher Handbook: Arithmetic Operations Chapter 8
Q4	To understand a division statement as either an equal share or an equal group. Can complete a division equation.	Book 2b Chapter 14 Book 3a Chapter 7	Teacher Handbook: Arithmetic Operations Chapter 8
Q5	Practice recall of multiplication by 2, 5 and 10.	Book 2a Chapter 6 & 8	TH: Arithmetic Operations Chapter 9 EN Games Sets 10, 11, 12 D&C Games Set 7
Q6	To understand and recall division as inverse of x2, x5 or x10.	Book 2b Chapter 15	TH: Arithmetic Operations Chapter 9 D&C Games Set 8
Q7	Practice recall of multiplication facts.	Book 2b Chapter 6, 7 Book 3a Chapter 4, 5 & 6	TH: Arithmetic Operations Chapter 9 D&C Games Set 10 & 13
Q8	To apply the distributive property to doubling and halving of facts.	Book 3b Chapter 4	TH: Arithmetic Operations Chapter 9
Q9	To use inverse relationships to solve division.	Book 2b Chapter 15 Book 3a Chapter 4, 5 & 6	TH: Arithmetic Operations Chapter 8 & 9 D&C Games Set 11 & 14

TH - Teacher Handbook **EN Games** - Early Numeracy Games

D&C Games - Dice & Counter Games

These resources are available from the online store at www.thewilkieWAY.co.nz

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Problems: To develop conceptual understanding.

Knowledge Building Activities: Multiplication & Division Games.

Planning & Assessment: Multiplication & Division Progressions.

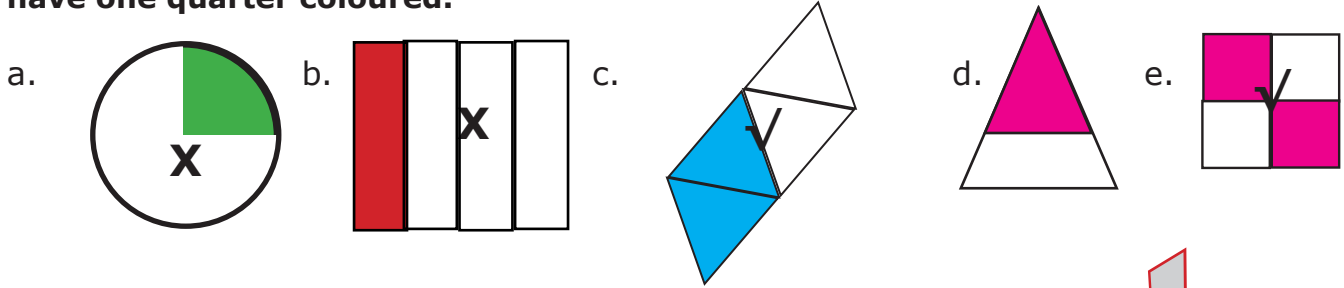
Practice Workbooks: Aligned to Pearson Book Chapters.

Professional Learning: Powerpoint - Teaching & Learning Basic Facts.

Pearson Book Chapters are referenced to MOE 'Figure it Out' books in the Pearson Mathematics Teacher Guides.

What do you know about fractions?

1. Put a \checkmark on the shapes that have one half coloured. Put a X on the shapes that have one quarter coloured.



2 a. Shows $\frac{1}{4}$ of the square

b. Shows $\frac{1}{3}$ of the circle

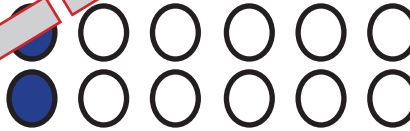
c. Write the fraction of the square NOT coloured $\frac{3}{4}$

d. Write the fraction of the circle NOT coloured $\frac{2}{3}$

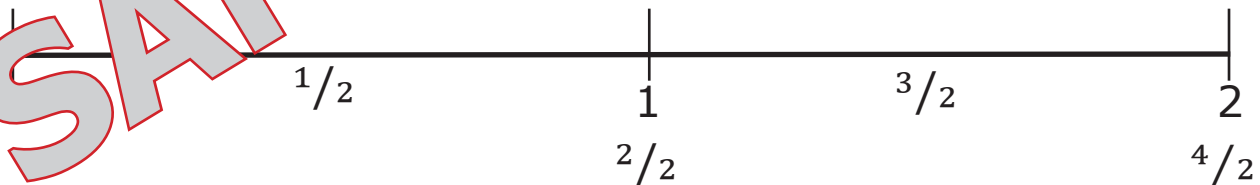
3a. Colour $\frac{1}{4}$ of the set of counters



b. Colour $\frac{1}{6}$ of the set of counters



4. Write these fractions in their correct position on the number line.



5a. 5 shared between 2 is $2\frac{1}{2}$ b. 2 shared between 3 is $\frac{2}{3}$

6a. $\frac{1}{3}$ of 15 is **5** b. $\frac{1}{5}$ of 30 is **6** c. $\frac{2}{7}$ of 28 is **8** d. $\frac{3}{5}$ of 20 is **12**

Maximum Score 20

Q1	4	Student understands half as two equal parts and quarter as four equal parts. (Subtract 2 marks if neither the half or quarter shape is marked half or quarter)
Q2	4	Student understands the denominator gives the number of equal parts to make the whole and the numerator defines how many equal parts.
Q3	2	Students is able to find the unit fraction of a set of objects.
Q4	4	Student is able to use half as a counting unit and is developing an understanding of fractions as numbers.
Q5	2	Student recognises a fraction as a result of a division (equal sharing)
Q6	4	Student understands the relationship between multiplication, division & fractions

Students need to develop an understanding of the different concepts represented by a fraction. Part whole relationships, understanding of fractions as an extension of numbers - from whole numbers to rational numbers and as quotients, the result of a division.

Note: Q2c & d Does the student write the fraction symbolically or correctly in words? It is common for student at this level to write fractions in words as they are still learning the symbols for fractions.

Resources for Teaching and Learning			
		Pearson Mathematics	Wilkie Way
Q1	To understand half as two equal parts and quarter as four equal parts.	Level 1 Unit 16 Book 2a Chapter 13 Book 2b Chapter 12	Teacher Handbook: Fractions, Decimals & Percentages. Chapter 4 D&C Games Set 6
Q2	To understand the denominator gives the number of equal parts to make the whole and the numerator defines how many equal parts.	Book 2a Chapter 13 Book 2b Chapter 12	Teacher Handbook: Fractions, Decimals & Percentages. Chapter 4
Q3	To be able to find the unit fraction of a set of objects.	Level 1 Unit 16 Book 2a Chapter 14 Book 2b Chapter 13	Teacher Handbook: Fractions, Decimals & Percentages. Chapter 4 D&C Games Set 6
Q4	To be able to use half as a counting unit and begin to develop an understanding of fractions as numbers.		Teacher Handbook: Fractions, Decimals & Percentages. Chapter 7 D&C Games Set 6
Q5	To recognise a fraction as a result of a division (equally sharing).	Book 2a Chapter 13	Teacher Handbook: Fractions, Decimals & Percentages. Chapter 6
Q6	To understand the relationship between multiplication and division of fractions.	Book 2b Chapter 14	Teacher Handbook: Fractions, Decimals & Percentages. Chapter 6

Teacher Handbooks & D&C Games (Dice & Counter Games) are available from the online store at www.thewilkie way.co.nz

The following are available from www.thewilkie way.co.nz members content area (subscription):

Problems: To develop conceptual understanding.

Classroom Posters: Understanding Fractions.

Planning & Assessment: Fractions Progressions.

Practice Workbooks: Aligned to Pearson Book Chapters.

Pearson Book Chapters are referenced to MOE 'Figure it Out' books in the Pearson Mathematics Teacher Guides.