



**Odd
Year**

The Wilkie Way

Mathematical Number Knowledge & Skills Assessment Screen Two

Teacher Guide & Answers

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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 covers learning statements from year 2 to year 4 of the refreshed curriculum.

The mathematics screened in this assessment are:

Whole Numbers	Can name columns (up to 5 digits), expand up to 4 digit numbers. Knows 10 more/10 less, groups of 10 in 2, 3 & 4 digit numbers, Can round numbers (up to 4 digits) to closest 10, 100, 1000
Add & Subtract	Recalls or derives addition & subtraction facts to 20, Recalls teens & doubles. Can add and subtract 2 and 3 digit numbers.
Multiply & Divide	Can make equal groups. Understands multiplication as repeated addition. Recognises an array to represent multiplication and knows multiplication is commutative. Understands a division statement as equal grouping or equal sharing. Recalls or derives multiplication & division facts. Uses the distributive property to multiply a double digit by a single digit number.
Fractions	Recognises half as 2 equal parts and quarters as 4 equal parts Identifies a unit fraction of a shape or quantity. Writes non unit fractions. Knows fractions can be compared and order (on a number line). Can use division to find a unit fraction of a quantity. Can represent one place decimals as a fraction.

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

	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

	Begin Year 3	End Year 3/Begin Year 4	End Year 4
Overall Score	10 - 25	26 - 60	61 - 100
Whole Number	2 - 6	7 - 16	17 - 30
Add/Sub	4 - 10	11 - 22	22 - 26
Mult/Div	2 - 5	6 - 12	13 - 24
Fractions	2 - 5	6 - 12	13 - 20

Students scoring an overall score of less than 10% should be rescreened on Screen One.
Students scoring 90 - 100% at the start of a year should be rescreened on Screen Three.

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**

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

- a. 72 **70 + 2** c. 3583 **3000 + 500 + 80 + 3**
 b. 264 **200 + 60 + 4** d. 14 602 **10 000 + 4000 + 600 + 2**

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

- a. 42 **52** b. 165 **175** c. 295 **305** d. 6400 **6503**

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

- a. 84 **74** b. 329 **319** c. 406 **396** d. 2504 **2494**

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

- a. 35 **3** b. 184 **18** c. 765 **76** d. 4723 **472**

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

- a. 38 **40** b. 113 **70** c. 645 **650** d. 1267 **1270**

7. Round each number to the closest 100

- a. 436 **400** b. 789 **800** c. 4632 **4600** d. 3450 **3500**

8. Round each number to the closest 1000

- a. 5643 **6000** b. 7289 **7000**

Maximum Score 30		
Q1	4	Student knows column values of whole numbers (up 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	4	Student shows an understanding of the multiplicative structure of the number system, groups of ten repeatedly nesting inside groups of ten.
Q6	4	Student is able to round numbers to the closest ten (decade) with up to 4 digit numbers and understand the convention of rounding up when the digit 5 is involved.
Q7	4	Student is able to round to the closest hundred.
Q8	2	Student is able to round to the closest thousand.

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			
		Maths Aotearoa	Wilkie Way Resources
Q1	Knows column values of whole numbers (to 5 digits)	Level 1B Unit 4 Book 2A Chapter 4 Book 2B Chapter 4 Book 3A Chapter 6 Pearson Maths Level 1 Unit 24 Book 2A Chapter 4 Book 2B Chapter 4 Book 3A Chapter 3	Teacher Handbook Numbers & The Number System Dice & Counter Games Set 5 Beginning Place Value Maths Aotearoa Practice Workbooks Book 1B 23. Using 10 as a counting Set 24. The Importance of a group of ten Book 2A 2. Numbers to 100 6. Add & Subtract Decades, Rounding to the Closest Decade Book 2B 16. Numbers to 999 21. Rounding & Estimating
Q2	Understands the additive structure of number in their standard partitions.	Book 2A Chapter 10 Book 2B Chapter 2 & 4 Pearson Maths Book 2A Chapter 10 Book 2B Chapters 2, 4	
Q3 Q4	Understands the importance of 10 in the number system when adding and subtracting.	Book 1B Unit 4 Book 2A Chapter 3 Book 2B Chapter 4 Pearson Maths Level 1 Unit 23 Book 2A Chapter 3 Book 2B Chapter 4	
Q5	Understands the multiplicative structure of the number system, groups of ten repeatedly nesting inside groups of ten.	Book 2a Chapter 4, 7 Book 2B Chapter 4 Pearson Maths Book 2A Chapters 4, 7 Book 2B Chapter 4	
Q6	Can round numbers to the closest ten (decade) with two digit numbers and understand the convention of round up when the digit 5 is involved.	Book 2A Chapter 9 Book 2B Chapter 2 Pearson Maths Book 2A Chapter 9 Book 2B Chapter 2	
Q7	Can round to the closest hundred.	Book 2B Chapter 9 Pearson Maths Book 2B Chapter 9	
Q8	Can round to the closest thousand	Book 3A Chapter 6	

Teacher Handbooks & Dice & Counter Games are available from the online store www.wilkieway.co.nz

Maths Aotearoa Practice Workbooks are available along with further resources in the members area of www.wilkieway.co.nz (subscription)

Student Resources Numbers & The Number System Phase One & Phase Two

Place Value Activities
Place Value Games
Place Value Problems

Teacher Professional Learning

Place Value Progressions
Power Point: Place Value, The Heart of the Number System

**What do you know about addition and subtraction?
Complete the following equations.**

Make a note of students who are using counting rather than recall of these basic addition and subtraction facts.

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

3a. $50 + 40 = 90$ b. $70 + 60 = 130$ c. $43 + 9 = 52$
 d. $80 - 30 = 50$ e. $140 - 60 = 80$ f. $111 - 9 = 102$

Solve the following equations (you can re-write the equations vertically)

4a. $63 + 24 = 87$ b. $95 - 52 = 43$

5a. $65 + 28 = 93$ b. $84 - 37 = 47$

6a. $426 + 38 = 464$ b. $671 - 47 = 624$

Look out for students who mis-align columns when re-writing vertically.

7a. $376 + 385 = 761$ b. $532 - 186 = 346$

Maximum Score 20		
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	2	Student uses knowledge of facts to 10 and understand they are repeated in other columns in the number system and can use 10 to add or subtract 9.
Q4	2	Student can add and subtract 2 digit numbers without renaming.
Q5	2	Student can add and subtract 2 digit numbers involving renaming.
Q6	2	Student can add or subtract a two digit to/from a three digit number, aligning columns correctly.
Q7	2	Student can add and subtract three digit numbers.
<p>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.</p>		

Resources for Teaching and Learning			
		Maths Aotearoa	Wilkie Way Resources
Q1	Can recall basic addition & subtraction facts within 10, doubles and teens.	Book 1B Unit 1 & 2 Book 2A Chapter 1 & 2 Pearson Maths Level 1 Unit 21 Level 2A Chapters 1 & 2	Teacher Handbooks Arithmetic Operations Numbers & The Number System Dice & Counters Games Set 3 Addition & Subtraction to 10 Set 9 Addition & Subtraction to 20 Maths Aotearoa Practice Workbooks Book 1B 16 Making 10 19 Working with Doubles 25 Add & Subtract to 20 Book 2A 1. Addition & Subtraction: Facts to 10 ,Teens and Doubles 6. Add & Subtract Decades 7. Multi Digit Addition 8. Multi Digit Subtraction 10. Number Facts to 20 12. Adding without counting 13. Subtracting without counting Book 2B 14. Double digit Addition 15. Double Digit Subtraction Book 3A 2. Add & Subtract
Q2	Can recall basic addition and subtraction facts with 20, near doubles, near teens, facts using facts to 10.	Book 1B Unit 1, 2 Book 2A Chapter 12, 15 Book 2B Chapter 1 Pearson Maths Level 1 Unit 25 Book 2A Chapters 12, 15 Book 2B Chapter 1	
Q3	Can use knowledge of basic fact additive patterns and use 10 to add 9	Book 2A Chapter 9, 10, 11 Pearson Maths Book 2A Chapter 9, 10,11	
Q4	Can add & subtract 2 digit numbers without renaming	Book 2A Chapter 10 Book 2B Chapter 2 Pearson Maths Book 2A Chapter 11, 15 Book 2B Chapter 2	
Q5	Can add and subtract 2 digit numbers with renaming.	Book 2A Chapter 15,16 Book 2B Chapter 3, 4 Pearson Maths Book 2A Chapter 15, 16 Book 2B Chapter 3, 4	
Q6	Can add or subtract with 2 and 3 digit numbers	Book 2B Chapter 2, 3, 10, 11 Book 3A Chapter 4, 5 Pearson Maths Book 2B Chapter 11, 16 Book 3A Chapter 1, 2	
Q7	Can add and subtract three digit numbers.	Book 2B Chapter 10, 11 Book 3A Chapter 4, 5 Pearson Maths Book 2B Chapter 11, 16 Book 3A Chapter 1, 2	

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Student Resources - Add & Subtract Phase One & Phase Two

Addition & Subtraction Problems
Addition & Subtraction Games

Teacher Professional Learning

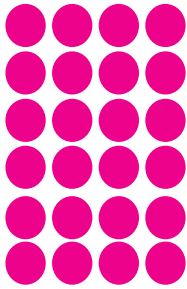
Addition & Subtraction Progressions & Learning Outcomes
Power Point: Teaching & Learning Basic Facts

What do you know about multiplication and division?

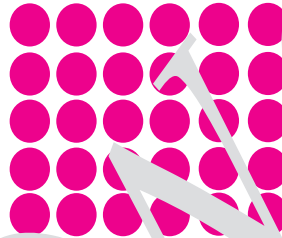
1. Picture shows 3 groups of 7 or 7 groups of 3

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

3. Write both multiplications shown by each array.

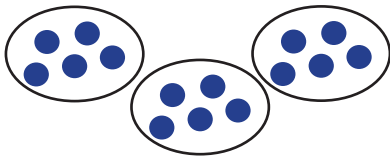


a. 4×6
b. 6×4

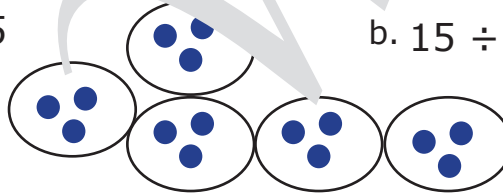


a. 5×5
b. 5×6

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



or



b. $15 \div 5 = 3$

15 divided into groups of 5 giving 3 groups 15 shared between 5 giving 3 each

Complete these equations:

5a. $7 \times 2 = 14$

b. $8 \times 5 = 40$

c. $10 \times 6 = 60$

6a. $16 \div 2 = 8$

b. $20 \div 5 = 4$

c. $70 \div 10 = 7$

7a. $6 \times 6 = 36$

b. $4 \times 8 = 32$

c. $3 \times 9 = 27$

8a. $17 \times 4 = 68$

b. $16 \times 5 = 80$

c. $32 \times 5 = 160$

9a. $36 \div 4 = 9$

b. $42 \div 6 = 7$

c. $24 \div 10 = 2.4$

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 recalls or derives multiplication facts
Q8	3	Student applies the distributive property or doubling and halving to solve double digit by single digit multiplication.
Q9	3	Student uses the inverse relationships to solve division and know decimals are created by dividing by 10

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			
		Maths Aotearoa	Wilkie Way Resources
Q1	Can represent an equal sharing or equal grouping in a diagram.	Book 1B Unit 2 & 3 Book 2A Chapter 14 Book 2B Chapter 8 Pearson Maths Level 1 Unit 16 Book 2A Chapter 14 Book 2B Chapter 8	Teacher Handbook Arithmetic Operations Dice & Counter Games Set 7 Multiplication Practice x 2,3,4,5 Set 8 Division Practice ÷ 2,3,4,5 Set 10 Multiplication Practice x 6,7,8,9 Set 11 Division Practice ÷ 6,7,8,9 Set 13 Multiplication Practice Set 14 Division Practice
Q2	Can represent a repeated addition and record a repeated addition statement as a multiplication statement.	Book 1B Unit 2 Book 2A Chapter 6, 7, 8 Pearson Maths Level 1 Unit 22 Book 2A Chapter 6,7,8	
Q3	Understands the array model represents the commutative property.	Book 2A Chapter 7 Book 2B Chapter 15 Pearson Maths Book 2A Chapter 7	
Q4	Understands a division statement as either an equal share or an equal group. To complete a division equation.	Book 2B Chapter 8, 14 Book 3A Chapter 1,2,3,7 Pearson Maths Book 2B Chapter 14 Book 3A Chapter 7	Maths Aotearoa Practice Workbooks Book 1B 18 Equal Grouping 21 Equal Sharing Book 2A 4. Multiply by 2 5. Multiply by 10 & 5 Book 2B 18. Working with 3 and 9 times tables 19. Doubling x2 x4 x8 20. Equal Grouping, equal Sharing 25. Understanding Division Multiples & Factors
Q5	Can recall multiplication facts for 2, 5 and 10	Book 2A Chapter 6, 7 & 8 Pearson Maths Book 2A Chapter 6,7,8	
Q6	Can recall division facts inverse of x2 x5 or x10.	Book 2B Chapter 8, 14, 15 Pearson Maths Book 2B Chapter 15	
Q7	Can recall or to derive multiplication facts.	Book 2B Chapter 6, 7, 8 Book 3A Chapter 1, 2, 3 Pearson Maths Book 2B Chapter 8 Book 3A Chapters 4,5,6	
Q8	Can apply the distributive property or doubling and halving to derive facts.	Book 2B Chapters 6, 7,15 Book 3A Chapters 1 ,2 ,3	
Q9	Can use inverse relationships to solve division and knows decimals are created by dividing by 10.	Book 2B Chapter 14, 15 Book 3A Chapter 1 ,2, 3,9 Pearson Maths Book 2B Chapter 15 Book 3A Chapter 7	

Teacher Handbooks & Dice & Counter Games are available from the online store www.wilkieway.co.nz

Maths Aotearoa Practice Workbooks are available along with further resources in the members area of www.wilkieway.co.nz (subscription)

Student Resources - Multiply & Divide Phase One & Phase Two & Maths Gym

Multiplication & Division Problems

Multiplication & Division Games

Teacher Professional Learning

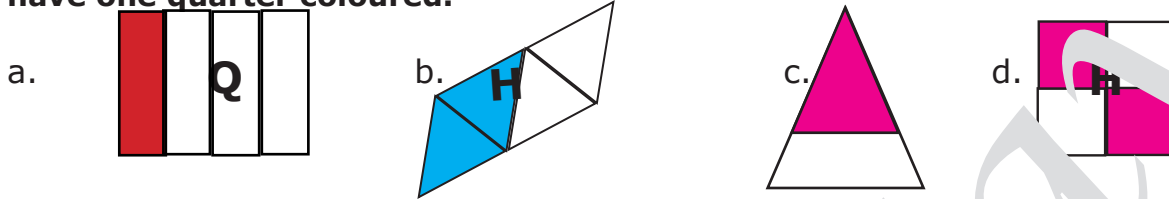
Multiplication & Division Progressions & Learning Outcomes

Power Point: Teaching & Learning Basic Facts

Maths Aotearoa is available from www.edify.co.nz

What do you know about fractions?

1. Put a H on the shapes that have one half coloured. Put a Q on the shapes that have one quarter coloured.




2 a. Shows $\frac{1}{8}$ of the square

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

c. Write the fraction of the square NOT coloured. $\frac{7}{8}$

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

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

b. Colour $\frac{1}{5}$ of the set of counters 

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



5a. $\frac{1}{3}$ of 15 = 5 $\frac{1}{5}$ of 30 = 6

6a $\frac{1}{4}$ of 12 = 3 b. $\frac{1}{5}$ of 20 = 4

7a $0.6 = \frac{6}{10}$ b. $0.2 = \frac{2}{10}$

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	4	Students is able to find the unit fraction of a set of objects.
Q4	4	Student can compare and order fractions on a number line.
Q5	2	Student is able to use division to find a fraction of a number
Q6	2	Student can find the whole quantity given the fractional part.
Q7	2	Student can express a one place decimal as a fraction.

Students need to develop an understanding of the different concepts represented by a fraction. The basic concept is the concept of equal parts or equal groups. Students need to come to the understanding that a fractions are numbers that can be compared and ordered. As numbers they can be used to operate on whole numbers.
Decimal numbers are a set of special fractions with the denominator being a power of ten.

Resources for Teaching and Learning			
		Maths Aotearoa	Wilkie Way Resources
Q1	Understands half as two equal parts and quarter as four equal parts.	Book 1B Unit 3 Book 2A Chapter 13 Book 2B Chapter 12 Pearson Maths Level 1 Unit 16 Book 2A Chapter 13 Book 2B Chapter 12	Teacher Handbook Fractions, Decimals & Percentages Dice & Counter Games Set 6 Beginning Fractions Set 12 Fractions
Q2	Knows 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 Pearson Maths Book 2A Chapter 13 Book 2B Chapter 12	Maths Aotearoa Practice Workbooks Book 1B 20. Fractions of Shapes 22. Fractions of Numbers
Q3	Can find the unit fraction of a set of objects.	Book 1B Unit 3 Book 2A Chapter 14 Book 2B Chapter 13 Pearson Maths Level 1 Unit 16 Book 2A Chapter 14 Book 2B Chapter 13	Book 2A 11. All about Halves & Quarters Book 2B 24. Understanding Fraction
Q4	Can compare and order fractions on a number line	Book 2B Chapter 12	
Q5	Can find a unit fraction of a number using division	Book 2A Chapter 13 Pearson Maths Book 2A Chapter 13	
Q6	Can find the whole quantity given the fractional part.	Book 2A Chapter 14 Book 2B Chapter 14 Book 3A Chapter 8 Pearson Maths Book 2B Chapter 14	
Q7	Can express a one place decimal as a fraction.		

Teacher Handbooks & Dice & Counter Games are available from the online store www.wilkieway.co.nz

Maths Aotearoa Practice Workbooks are available along with further resources in the members area of www.wilkieway.co.nz (subscription)

Student Resources

Fraction Cards
Fraction Posters - Understanding Fractions
Fraction Problems

Teacher Professional Learning

Fractions Progressions & Learning Outcomes (included in Multiplication & Division)
Power Point: Fractions & The Learning Progressions

Maths Aotearoa is available from www.edify.co.nz

Administering the screening assessment.

This assessment is not timed. Sections can be completed at different times rather than taking the whole assessment screen in one go. Use in term 1 and repeat in term 4 (use same booklet and a different colour pen), to show knowledge built over the year.

This screen covers the expectations of students working in year 3 and 4 of the refreshed curriculum. Progress in building the knowledge and skills for continued progress in year 5 can be assessed using this screen.

An expected score for beginning and end of year 3 and 4 is shown on the front of this teacher guide.

Curriculum levels are currently shown to allow for continuity in data comparison as schools transition to year comparisons rather than level comparisons.

Students with a specific reading difficulty may have a reader to ensure they understand the question. 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.

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 a similar weighting of 26 for addition and subtraction and 24 for multiplication and division. Students in year 3 should be scoring higher in addition and subtraction than in multiplication and division as the curriculum is weighted towards addition and subtraction in year 3 and multiplication and division in year 4.

Fractions contributes 20 marks to the overall score and fractions (rational numbers) are an important section in the refreshed curriculum and will require in depth teaching across the whole year and not in a two week topic during the year.

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 or has not yet been met in the classroom programme and requires specific targeted teaching and learning practice.

Maths Aotearoa and Wilkie Way resources have been identified for further teaching and learning experiences. A single chapter often covers multiple areas as areas should not be taught in isolation but as connected knowledge. (Pearson Maths links have been included but this series of books have been replaced with Maths Aotearoa)

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

To find out more information on the use of knowledge and skills to solve problems use the Primary Maths Assessment Tool (PMAT) published by Edify (ISBN 978094749562). It would be expected that students working within year 3 and 4 knowledge would be assessed using Section 3 and 4 of this problem solving assessment tool.

These assessments are primarily for use in identifying next teaching and learning steps and do not necessarily need to be matched to curriculum levels except if used for reporting purposes.

Maths Aotearoa and PMAT are available from www.edify.co.nz