



# The Wilkie Way

## Mathematical Number Knowledge & Skills Assessment Screen One

### 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. This screening covers learning statements from During the first 6 months, during year one and during year 2 of the refreshed curriculum.

The areas of mathematics screened in this assessment:

|                                      |   |
|--------------------------------------|---|
| <b>Whole Numbers</b>                 | Knows counting sequences (forwards and backwards in ones in the range 1 - 100, 1 more/less 10 more/10 less,   |
| <b>Addition &amp; Subtraction</b>    | Basic addition & subtraction facts within 5, 5+, doubles, to 10, 10+<br>Uses facts to 10 in tens columns.<br>Knows additive structure of place value (standard partitions)<br>Knows basic facts are repeated in the tens column |
| <b>Multiplication &amp; Division</b> | Knows counting sequences in 2s, 5s, 10s<br>Can equal share into groups.<br>Knows place value groupings of ten in 2 digit numbers<br>Can recall x2 x5 x 10 facts (knows x symbol)  |

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

|                           | <b>Early Level 1</b> | <b>Mid Level 1</b> | <b>Upper Level 1</b> | <b>Early Level 2</b> |
|---------------------------|----------------------|--------------------|----------------------|----------------------|
| <b>Overall Score</b>      | 0 - 3                | 4 - 15             | 16 - 39              | 40 - 50              |
| <b>Whole Numbers (PV)</b> | 0 - 3                | 4 - 7              | 8 - 14               | 15 - 18              |
| <b>Add/Sub (PV)</b>       | 0                    | 1 - 3              | 4 - 16               | 17 - 20              |
| <b>Mult/Div (PV)</b>      | 0                    | 1 - 3              | 4 - 8                | 9 - 12               |

|                           | <b>End of 6 months</b> | <b>End Year 1/Begin Year 2</b> | <b>End Year 2</b> |
|---------------------------|------------------------|--------------------------------|-------------------|
| <b>Overall Score</b>      | 5 - 9                  |                                |                   |
| <b>Whole Numbers (PV)</b> | 3 - 5                  | 6 - 9                          | 10 - 18           |
| <b>Add/Sub (PV)</b>       | 2 - 4                  | 6 - 9                          | 10 - 20           |
| <b>Mult Div (PV)</b>      | 0 - 1                  | 2 - 5                          | 6 - 12            |

Use teacher judgment for use of screen with students at end 6 months. Repeating the baseline assessment may be more appropriate.

(Available in the members area of [wilkieaway.co.nz](http://wilkieaway.co.nz))

## What do you know about numbers?

### 1. Continue the counting sequences

2 3 4 5 **6 7 8**

12 13 14 **15 16 17**

26 27 28 **29 30 31**

44 43 42 **41 40 39**

### 2. Write the number that comes after the given number

6 **7**, 18 **19**, 49 **50**, 169 **170**

### 3. Write the number that is before the given number

**8** 9, **13** 14, **79** 80, **143** 144

### 4. Write the number 10 more than the given number

5 **15**, 14 **24**, 36 **46**

### 5. Write the number 10 less than the given number

**3** 13, **17** 27, **52** 62

| Maximum Score 18 |   |  |
|------------------|---|--|
| <b>Q1</b>        | 4 | Students know forward and backward counting sequences in the range 1 - 100                                     |
| <b>Q2</b>        | 4 | Students understand and can give the number after (note if you need to explain after as the number one more)   |
| <b>Q3</b>        | 4 | Students understand and can give the number before (note if you need to explain the number before as one less) |
| <b>Q4</b>        | 3 | Students understand a group of ten can be used as a counting set and results in one more in the tens column.   |
| <b>Q5</b>        | 3 | Students understand a group of ten can be used as a counting set and results in one less in the tens column.   |

The foundation of working with numbers is an understanding of counting. This involves knowing counting sequences and understanding that the number after a given number is the result of adding one more and the number before is the result of subtracting (one less) than the given number.

The number system works on repeated groupings of ten, so the counting sequence can be repeated in any column.

The counting sequence in the tens column is the hardest to master as it requires a new set of words (ten, twenty, thirty etc). The hundreds column reverts back to one, two three - hundred.

| <b>Resources for Teaching and Learning</b> |  |   |   |
|--|--|---|---|
|  |  | <b>Maths Aotearoa</b>   | <b>Wilkie Way Resources</b>   |
| <b>Q1</b>                                  | Knows forward and backward counting sequences in the range 1 - 100 | <b>Book 1A</b> Unit 1, 2, 4<br><b>Book 1B</b> Unit 2<br><b>Book 2A</b> Chapter 3<br><br><b>Pearson Maths Level 1</b> Unit 17<br><b>Book 2A</b> Chapter 3    | <b>Teacher Handbooks</b><br>Numbers & The Number System<br><br><b>Dice &amp; Counter Games</b><br>Set 2 Counting Sequences<br>Set 5 Beginning Place Value<br><br><b>Maths Aotearoa Practice Workbooks</b><br><br><b>Book 1A</b><br>2. Ordering numbers to 6<br>4. Ordering numbers to 10<br>10. Numbers to 20<br><br><b>Book 1B</b><br>17. Sequencing to 100<br>23. Using 10 as a Counting Set<br><br><b>Book 2A</b><br>2. Numbers to 100 |
| <b>Q2</b>                                  | Knows the number after in range 0 - 100                            | <b>Book 1A</b> Unit 1, 2, 4<br><b>Book 1B</b> Unit 2<br><b>Book 2A</b> Chapter 3<br><br><b>Pearson Maths Level 1</b> Unit 17,19<br><b>Book 2A</b> Chapter 3 |   |
| <b>Q3</b>                                  | Knows the number before in range 0 - 100                           | <b>Book 1A</b> Unit 1,2, 4<br><b>Book 1B</b> Unit 2<br><b>Book 2A</b> Chapter 3<br><br><b>Pearson Maths Level 1</b> Unit 17,19<br><b>Book 2A</b> Chapter 3  |   |
| <b>Q4</b>                                  | Knows 10 more than a given number within 100                       | <b>Book 1B</b> Unit 2 & 4<br><b>Book 2A</b> Chapter 3<br><br><b>Pearson Maths Level 1</b> Unit 18, 23<br><b>Book 2a</b> Chapter 3                           |   |
| <b>Q5</b>                                  | Knows 10 less than a given number within 100                       | <b>Book 1B</b> Unit 2 & 4<br><b>Book 2A</b> Chapter 3<br><br><b>Pearson Maths Level 1</b> Unit 18, 23<br><b>Book 2A</b> Chapter 3                           |   |

**Teacher Handbooks & Dice & Counter Games** are available from the online store [www.wilkieway.co.nz](http://www.wilkieway.co.nz)

**Maths Aotearoa Practice Workbooks** are available along with further resources in the members area of [www.wilkieway.co.nz](http://www.wilkieway.co.nz) (subscription)

### **Student Resources Numbers & The Number System Phase One**

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

**Maths Aotearoa is available from [www.edify.co.nz](http://www.edify.co.nz)**

# What do you know about addition and subtraction?

## 1. Write the answers

$3 + 2 = 5$

$4 + 4 = 8$

$8 + 8 = 16$

$5 + 1 = 6$

$7 + 3 = 10$

$10 + 4 = 14$

## 2. Write the answers

$4 - 1 = 3$

$6 - 3 = 3$

$18 - 9 = 9$

$9 - 4 = 5$

$10 - 6 = 4$

$15 - 5 = 10$

## 3. Write the answers

$20 + 4 = 24$

$50 + 8 = 58$

$35 - 5 = 30$

$43 - 3 = 40$

## 4. Write the answers

$70 + 20 = 90$

$43 + 20 = 63$

$80 - 30 = 50$

$78 - 35 = 43$

### Maximum Score 20

|    |   |  |
|----|---|--|
| Q1 | 6 | Students recall addition facts: within 5, + 1, doubles to 10, doubles to 20, 5+, facts to 10, 10+  |
| Q2 | 6 | Students relate subtraction facts to addition facts, within 5, recognising doubles, pairs to make ten, 5+ and 10+                                      |
| Q3 | 4 | Students understand the additive structure of the number system knowing a two digit number can be partitioned into tens and ones. (Standard partition) |
| Q4 | 4 | Students understand basic addition & subtraction facts are repeated in the tens column.  |

Observe students completing this section. Impress on the students that you want to see if they know the answer without having to work it out. Many students persist in counting in a "test" situation as they know counting will give them the right answer. Do not mark them wrong if they count - recall of basic facts is more easily assessed when they realise the basic facts are repeated in the tens column although some will still count but in tens.

Recall of basic facts is more easily assessed when students use them not as an end point as in a test. This can be observed in a game situation or when using a part/whole strategy to solve equations like  $35 + 8$  as  $35 + 5 + 3$ .

To do this students must see 8 as  $5 + 3$  to get  $40 + 3$

Subtraction situations like  $63 - 8$  as  $63 - 3 - 5$  requires students to see 63 as  $60 + 3$  and 8 as  $3 + 5$

| <b>Resources for Teaching and Learning</b> |   |  |   |
|--|---|--|---|
|  |   | <b>Maths Aotearoa</b>  | <b>Wilkie Way Resources</b>   |
| <b>Q1</b>                                  | Can recall addition facts to 5, doubles to 10, doubles to 20, 5+ facts, make 10 and 10+ facts | <b>Book 1A</b> Unit 3<br><b>Book 1B</b> Unit 1<br><b>Book 2A</b> Chapters 1, 2<br><br><b>Pearson Maths</b><br><b>Level 1</b> Units 15, 18, 21, 25<br><b>Book 2A</b> Chapters 1 & 2 | <b>Teacher Handbooks</b><br>Numbers & The Number System<br>Arithmetic Operations<br><br><b>Dice &amp; Counter Games</b><br>Set 3<br>Addition & Subtraction to 10  |
| <b>Q2</b>                                  | Can recall corresponding subtraction facts  | <b>Book 1A</b> Unit 3<br><b>Book 1B</b> Unit 1<br><b>Book 2A</b> Chapters 1,2<br><br><b>Pearson Maths</b><br><b>Level 1</b> Units 15, 18, 21<br><b>Book 2A</b> Chapters 1 & 2      | <b>Maths Aotearoa Practice Workbooks</b><br><br><b>Book 1A</b><br>6. Groupings to 5<br>7. Addition<br>8. Subtraction<br>11. Doubles to 20<br><br><b>Book 1B</b><br>13. Adding & Taking Away<br>16. Making 10<br>24. The Importance of a Group of 10<br>25. Addition & Subtraction to 20 |
| <b>Q3</b>                                  | Knows 2 digit numbers can be partitioned into 10s and 1s                                      | <b>Book 1B</b> Unit 4<br><b>Book 2A</b> Chapter 4<br><br><b>Pearson Maths</b><br><b>Level 1</b> Unit 24<br><b>Book 2A</b> Chapter 4  | <b>Book 1B</b><br>13. Adding & Taking Away<br>16. Making 10<br>24. The Importance of a Group of 10<br>25. Addition & Subtraction to 20  |
| <b>Q4</b>                                  | Knows basic addition & subtraction facts are repeated in the tens column.                     | <b>Book 1B</b> Unit 4<br><b>Book 2A</b> Chapters 9, 10<br><br><b>Pearson Maths</b><br><b>Level 1</b> Unit 23<br><b>Book 2A</b> Chapters 9,10                                       | <b>Book 2A</b><br>1. Addition & Subtraction, Facts to 10, Teens & Doubles<br>7. Multi digit addition<br>8. Multi digit subtraction  |

**Teacher Handbooks & Dice & Counter Games** are available from the online store [www.wilkieWAY.co.nz](http://www.wilkieWAY.co.nz)

**Maths Aotearoa Practice Workbooks** are available along with further resources in the members area of [www.wilkieWAY.co.nz](http://www.wilkieWAY.co.nz) (subscription)

#### **Student Resources - Add & Subtract Phase One**

Addition & Subtraction Problems  
 Addition & Subtraction Games

#### **Teacher Professional Learning**

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

**Maths Aotearoa is available from [www.edify.co.nz](http://www.edify.co.nz)**

## What do you know about multiplication and division?

### 1. Continue the sequences:

- 2, 4, 6, **8, 10, 12, 14, 16**
- 5, 10, 15, **20, 25, 30, 35, 40**
- 10, 20, 30, **40, 50, 60, 70, 80**

### 2a. Draw a picture to show 12 counters shared into equal groups.

Drawing could show: 2 groups of 6, 3 groups of 4, 4 groups of 3, 6 groups of 2

### 2b. Draw a picture to show 21 counters shared into equal groups.

Drawing could show: 3 groups of 7, 7 groups of 3,

(Sharing an odd number as well as an even number has been included because evidence over time has shown many students can share between two but not make any more than 2 equal groups believing you can't do it)

### 3. How many groups of ten counters can you make with

- 30 counters **3**
- 70 counters **7**
- 16 counters **1**
- 53 counters **5**

### 4. Write the answers

a.  $7 \times 2 = 14$

b.  $3 \times 10 = 30$

c.  $4 \times 5 = 20$

| Maximum Score |   |   |
|---------------|---|---|
| Q1            | 1 | Students can count in 2s, 5s and 10s  |
| Q2            | 2 | Students are able to represent an equal grouping or equal sharing.  |
| Q3            | 4 | Students understand a number shows how many groups of ten by the position of the digit in the number. (Place value) |
| Q4            | 4 | Students understand the multiplication symbol and recalls multiplication by 2, 5 and 10                             |

Early knowledge of multiplication, division and fractions begins with an understanding of equal grouping.

To solve problems using skip counting, students will need to know the skip counting sequences. However they should not be learning skip counting sequences as an aid for recalling all multiplication facts.

Counting in twos, fives and tens is for learning about equal grouping other than groups of one and will need to be developed further into array thinking at the next level. Learning about the commutative property of multiplication leads students to make use of doubles knowledge rather than a reliance on skip counting to solve equal grouping of 2 type problems.

Place value is dependent on understanding an equal group of ten, that initially works as a counting set but is the foundation of developing number sense and understanding how a base ten number system works.

| <b>Resources for Teaching and Learning</b> |   |  |  |
|--|---|--|--|
|  |   | <b>Maths Aotearoa</b>  | <b>Wilkie Way Resources</b>  |
| <b>Q1</b>                                  | Knows counting sequences in 2s, 5s and 10s                  | <b>Book 1A</b> Unit 4<br><b>Book 1B</b> Unit 2 & 4<br><b>Book 2A</b> Chapters 6, 7, 8<br><br><b>Pearson Maths Level 1</b> Unit 22<br><b>Book 2A</b> Chapters 6,7,8 | <b>Teacher Handbook</b><br>Arithmetic Operations<br><br><b>Dice &amp; Counter Games</b><br>Set 4: Beginning Multiplication (Skip Counting)<br>Set 5: Beginning Place Value<br>Set 7: Multiplication practice 2,3,4,5 |
| <b>Q2</b>                                  | Can represent equal sharing or equal grouping in a picture. | <b>Book 1A</b> Unit 4<br><b>Book 1B</b> Unit 2 & 3<br><b>Book 2A</b> Chapters 6, 7, 8<br><br><b>Pearson Maths Level 1</b> Unit 22<br><b>Book 2A</b> Chapters 6,7,8 | <b>Maths Aotearoa Practice Workbooks</b><br><b>Book 1A</b><br>12. Equal Sharing, Halves & Quarters<br><b>Book 1B</b><br>18 Equal Grouping<br>21 Equal Sharing<br>24. The Importance of a group of 10                 |
| <b>Q3</b>                                  | Knows how many groups of ten in a two digit number.         | <b>Book 1B</b> Unit 4<br><b>Book 2A</b> Chapters 3, 7<br><br><b>Pearson Maths Level 1</b> Unit 24<br><b>Book 2A</b> Chapters 3, 7                                  | <b>Book 2A</b><br>4. Multiply by 2<br>5. Multiply by 10 & 5  |
| <b>Q4</b>                                  | Can recall the two times, five times and 10 times tables.   | <b>Book 1B</b> Unit 2 & 4<br><b>Book 2A</b> Chapters 6, 7<br><br><b>Pearson Maths Level 1</b> Unit 22, 23<br><b>Book 2A</b> Chapters 6,7                           |  |

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**Maths Aotearoa Practice Workbooks** are available along with further resources in the members area of [www.wilkieway.co.nz](http://www.wilkieway.co.nz) (subscription)

### **Student Resources Multiply & Divide Phase One**

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](http://www.edify.co.nz)**

## Administering the screening assessment.

This assessment is not timed. It is not essential for all parts of the screen to be completed in one session. Use in term 1 and repeat in term 4 (use same booklet and a different colour pen), to show knowledge built over the year.

Assist students with the reading of instructions to ensure they understand the question being asked. How you administer the screen must be for the benefit of your students.

This screen covers the expectations of students working in years 1 and 2 of the refreshed curriculum. Progress in building knowledge and skills for continued progress in year 3 can be assessed using this screen.

An expected score for beginning and end of year 2 is shown on the front of this teacher guide. The score range for beginning year 2 is the range for end of year 1.

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 (Counting)** contributes 18 marks (36%) to the overall score. This section contributes just over a third of the weighting as without an understanding of counting students cannot make sense of operations with numbers with understanding.

**Addition/subtraction** contribute 20 marks (40%) to the overall score. This section has a high weighting as without an understanding of the additive structure of the number system and recall of some addition and subtraction facts students cannot progress their additive thinking.

**Multiplication/division** contributes just under a quarter of the weighting to the overall score 12 marks (24%). Early ideas of multiplication begin with an understanding of equal groups other than one and using counting sequences based on equal groups. The number system is based on an understanding of equal groups of ten that is used in the way the numbers are recorded. Students extend their knowledge of mathematical symbols to include the multiplication symbol (X).

Understanding the basic structures (standard partitioning and groupings in tens) and sequences in the number system are essential foundations for all further mathematical understanding.

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 will require specific targeted teaching and learning practice.

Maths Aotearoa and Wilkie Way resources have been identified for further teaching and learning experiences. A unit covers multiple concepts as knowledge 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)

The PMAT (Primary Maths Assessment Tool) published by Edify (ISBN 978094749562) is an assessment of mathematical problem solving. Section 3 of this assessment will identify whether students use simple place value, basic facts and knowledge of doubles or teens to solve problems or whether they are still reliant on counting. Sections 1 and 2 can be used as a baseline assessment.

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 and are intended as progress guidelines only.

Maths Aotearoa and PMAT are available from [www.edify.co.nz](http://www.edify.co.nz)  
(Maths Aotearoa is the third edition of what was formally known as Pearson Mathematics)