



The Wilkie Way

NZ Curriculum Screening Assessment Teacher Guide & Answers Mathematical Number Knowledge & Strategies Level 3 School Year 2017

- Whole Number
- Addition & Subtraction
- Multiplication & Division
- Fractions
- Decimals & Percentages

This screening assessment is designed by Charlotte Wilkinson. A private education consultant specialising in the teaching and learning of primary mathematics.

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 us specific weak areas within a level band that will require further teaching and learning experiences.

The areas of mathematics screened in this level 3 knowledge and strategy assessment are:

- Whole Numbers Place value, grouping & sequencing (rounding), large numbers.
- Addition & Subtraction Basic addition & subtraction facts including using inverse operations.
At level 3 students should be selecting an efficient method of carrying out an addition or subtraction which should include a written algorithm.
- Multiplication & Division Basic multiplication and division facts including inverse operations.
At level 3 students should be able to complete double digit by single digit multiplication and division using simple multiplicative strategies based on doubling and halving or the distributive property of multiplication.
- Fractions Fractions of a shape, fractions of a set, ordering fractions on a number line (including simple equivalents and improper fractions), fractions as operators.
- Decimals & Percentages Place value, grouping and sequencing, common fraction decimal conversion, common fraction percentage conversion.

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

Working at	Level 2	Level 2 - 3	At Level 3	Level 3 - 4	Level 4
Overall Score	0 - 35	36 - 54	55 - 77	78 - 90	91 - 100
Whole Number PV	0 - 9	10 - 12	13 - 15	16 - 18	19 - 20
Add/Sub	0 -9	10 - 12	13 - 15	16 - 18	19 - 20
Mult/Div	0 - 9	10 - 12	13 - 15	16 - 18	19 - 20
Fractions	0 - 5	6 - 8	9 - 16	15 - 18	19 - 20
Decimals	0 - 5	6 - 8	9 - 16	15 - 18	19 - 20

Administering the screening assessment

This assessment is not timed. Expect students to take around 30 - 60 minutes to complete.

Specific students may benefit from taking a break between completing each section.

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.

Each page has a score of 20 marks (one mark per correct answer).

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. If students make consistent errors then this particular area of knowledge is weak and requires specific targeted teaching and learning practice. Further detail for drilling down into student responses is given on each page.

On the addition and subtraction and the multiplication and division pages, a mark is given for correct answers but the students should also be showing a range of additive strategies and some simple multiplicative strategies.

If only one strategy is displayed, or the student is unable to show thinking in a recorded form, or answers are mostly incorrect then an assessment interview is required to uncover the student's thinking.

The Pearson Assessment Interview is suggested as it has questions designed to provide the opportunity to show different strategies and interviewer support to help identify what might be missing for these students.

www.edify.co.nz

Students successfully completing this screening assessment with only the occasional non specific mistake has the mathematical knowledge to confidently be able to deepen and build further mathematical concepts.

This assessment tool is included in the Beagle suite of assessment tools - a cloud based solution supporting NZ schools to raise student achievement and close the gap, use assessment data to drive instruction and save time in analysing and interpreting results.

www.beagleinnovations.com

What do you know about whole numbers?

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

- a. 6480 **four hundredths** b. 34 796 **thirty thousand**
c. 280 276 **zero thousands**

2. Write the following numbers.

- a. twenty thousand three hundred and forty six

20 346

- b. forty three million six hundred thousand and twenty three

43 600 023

- c. one hundred and two million, sixty eight thousand and four

102 068 004

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

- a. 358 **35** b. 2459 **245** c. 4035 **403**

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

- a. 3492 **34** b. 23 456 **234** c. 33 064 **630**

5. Round these numbers to closest hundred

- a. 378 **400** b. 843 **800** c. 255 **300** d. 627 **600**

6. Round these numbers to the closest ten (decade)

- a. 378 **380** b. 843 **840** c. 255 **260** d. 627 **630**

Maximum Score 20 Student knows column values of whole numbers. Student shows an understanding of the structure of large numbers. (required for working with exponents). Student shows an understanding of the multiplicative structure of numbers, groups of ten repeatedly nesting inside groups of ten. (Required for renaming numbers (canonical to non canonical form) for performing operations on numbers. Student shows an understanding of numbers in their sequential position. A pre-requisite for estimation and therefore number sense and use of a calculator.

What do you know about addition and subtraction?

Complete the following equations.

1a. $7 + 8 = 15$

b. $26 + 7 = 33$

c. $9 + 7 = 16$

d. $46 + 6 = 52$

e. $6 + 8 = 14$

f. $35 + 8 = 43$

2a. $17 - 9 = 8$

b. $62 - 7 = 55$

c. $13 - 7 = 6$

d. $53 - 5 = 48$

e. $15 - 7 = 8$

f. $34 - 5 = 29$

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

Solution should show an efficient method was used

3a. $58 + 26 = 84$

$$\begin{array}{r} 50 + 20 + 8 + 6 \\ 58 + 2 + 24 \\ 64 + 20 \end{array}$$

b. $64 + 29 = 93$

$$\begin{array}{r} 64 + 20 + 1 \\ 63 + 30 \end{array}$$

4a. $427 + 398 = 825$

$$\begin{array}{r} 427 + 400 - 2 \\ 425 + 400 \end{array}$$

b. $268 + 154 = 422$

$$\begin{array}{r} 268 + 32 = 122 \\ 250 + 150 + 18 + 4 \\ \text{Standard algorithm} \end{array}$$

5a. $56 - 39 = 17$

$$\begin{array}{r} 56 - 40 + 1 \\ 39 + 1 + 16 \end{array}$$

b. $63 - 26 = 37$

$$\begin{array}{r} 63 - 20 - 6 \\ 26 + 4 + 33 \end{array}$$

6a. $886 - 399 = 487$

$$886 - 400 + 1$$

b. $632 - 268 = 364$

standard algorithm

Maximum Score 20 Student should have recall of basic facts and an understanding of the signs and symbols as used in simple linear equations. Sequential knowledge of 2 digit numbers should require little effort to add or subtract (not count on or back) a single digit. Multi digit addition and subtraction should show an understanding of the properties of addition and subtraction including inverse relationships.

A student will often have a favourite strategy but it may not always be the most efficient. Plenty of discussion around efficient strategies should be part of classroom practice rather than trying to learn lots of different "procedures" to get an answer.

Does the student display a range of strategies - including rounding & compensating, standard partitioning and a written algorithm. If the student does not show they can complete a written algorithm check that they have this strategy. If student uses only an algorithm consider using an assessment interview tool. (recommended Pearson Assessment Tool)

What do you know about multiplication and division?

Complete the following equations.

1a. $3 \times 6 = 18$

b. $6 \times 7 = 42$

c. $4 \times 8 = 32$

d. $9 \times 6 = 54$

e. $7 \times 5 = 35$

f. $8 \times 8 = 64$

2a. $24 \div 4 = 6$

b. $48 \div 6 = 8$

c. $36 \div 4 = 9$

d. $56 \div 7 = 8$

e. $24 \div 3 = 8$

f. $36 \div 6 = 6$

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

3a. $14 \times 4 = 56$

$$\begin{aligned} &7 \times 8 \\ &(10 \times 4) + (4 \times 4) \\ &(14 \times 2) + (14 \times 2) \end{aligned}$$

b. $24 \times 5 = 120$

$$\begin{aligned} &24 \times 10 \div 2 \\ &(25 \times 5) - 5 \\ &(20 \times 5) + (4 \times 5) \end{aligned}$$

4a. $99 \times 4 = 396$

$$\begin{aligned} &100 \times 4 - 4 \\ &(90 \times 4) + (9 \times 4) \end{aligned}$$

b. $26 \times 8 = 208$

$$\begin{aligned} &(25 \times 8) + (1 \times 8) \\ &(20 \times 8) + (6 \times 8) \\ &26 \times 2 \times 2 \times 2 \end{aligned}$$

5a. $72 \div 4 = 18$

$$\begin{aligned} &72 \div 2 \div 2 \\ &(40 \div 4) + (32 \div 4) \end{aligned}$$

b. $84 \div 6 = 14$

$$\begin{aligned} &84 \div 2 \div 3 \\ &(60 \div 6) + (24 \div 6) \end{aligned}$$

6a. $670 \div 10 = 67$

place value

b. $160 \div 5 = 32$

$$160 \div 10 \times 2$$

Maximum Score 20 Does student have reasonable recall of multiplication and division facts? Lack of recall will affect the range of multiplicative strategies and the student may rely heavily on repeated doubling.

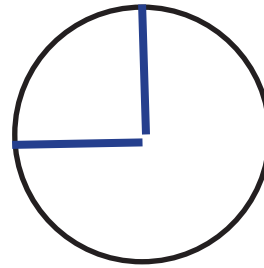
Does student use any of these strategies:

- doubling & halving
- rounding & compensating
- distributive property
- written algorithm
- place value knowledge

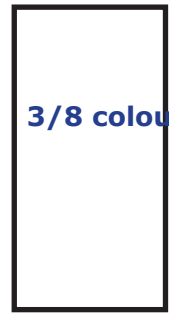
What do you know about fractions

Show the given fraction by colouring the fraction of the shape or set?

1a. Colour $\frac{1}{4}$ of the circle



1b. Colour $\frac{3}{8}$ of the rectangle



3/8 coloured

2a. Colour $\frac{1}{4}$ of the counters

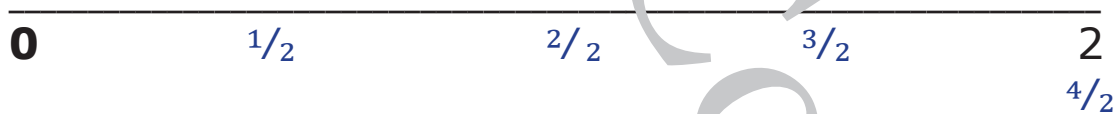


2b. Colour $\frac{2}{3}$ of the counters



Write these fractions where they belong on the number line

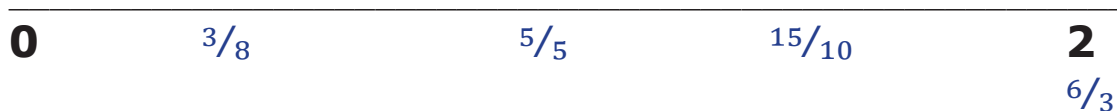
3a. $\frac{1}{2}$ b. $\frac{2}{2}$ c. $\frac{3}{2}$ d. $\frac{4}{2}$



4a. $\frac{1}{4}$ b. $\frac{2}{4}$ c. $\frac{3}{4}$ d. $\frac{5}{4}$



5a. $\frac{5}{5}$ b. $\frac{3}{8}$ c. $\frac{6}{3}$ d. $\frac{15}{10}$



Answer the following questions.

6a. What is $\frac{1}{6}$ of 42 **7**

b. What is $\frac{3}{4}$ of 32 **24**

c. What is $\frac{2}{9}$ of 45 **10**

d. What is $\frac{4}{7}$ of 56 **32**

Maximum Score 20 Student knows unit fraction and non unit fraction of a shape or set. Student understands fractions as a number to be compared and ordered into the set of whole numbers. Student knows fractions equivalent to whole numbers and accepts improper fractions. Approximate positioning required not just correct order. Student uses $\times \div$ to find fraction of a number.

What do you know about decimals and percentages?

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

- a. 2.3 **3 tenths** b. 3.86 **8 tenths**
c. 25.78 **8 hundredths** d. 2.236 **6 thousandths**

2. Write these numbers in sequence from smallest to largest

- a. 0.3 0.26 0.6 0.07 0.45
0.07 0.26 0.3 0.45 0.6
- b. 0.65 0.543 0.8 0.756 0.005
0.005 0.543 0.65 0.756 0.8

3. How many tenths in each of these numbers?

- a. 0.62 **6** b. 3.4 **34** c. 0.78 **67**

4. How many hundredths in each of these numbers?

- a. 0.35 **35** b. 1.56 **156** c. 3.6 **360**

5. Write these fractions as decimal numbers.

- a. $\frac{1}{2}$ **0.5** b. $\frac{1}{4}$ **0.25** c. $\frac{1}{5}$ **0.2** d. $\frac{15}{10}$ **1.5**

6. Write these fractions as a percentage

- a. $\frac{1}{2}$ **50%** b. $\frac{3}{4}$ **75%** c. $\frac{3}{10}$ **30%** d. $\frac{8}{20}$ **40%**

Maximum Score 20: Student understands decimal column values. Student orders decimal numbers correctly. Look for students ordering the decimals as if they were whole numbers (most common mistake). They display whole number thinking rather than fractional thinking required for work with decimals. This is likely to also show in the total value of tenths and hundredths. It is likely these students may be unable to order the fractions on the numberline in the previous section.

Common conversions show knowledge but not necessarily understanding.