Stage 3 Maths Program Term 1 Week 6

NSW K-10 Mathematics Syllabus Outcomes

Multiplication and Division (1)

MA3-6NA - Selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation

- Use and record a range of mental and written strategies to multiply by one- and two-digit operators
- Interpret remainders in division problems

Area (1) - relate to Multiplication and Division

MA3-10MG - Selects and uses the appropriate unit to calculate areas, including areas of squares, rectangles and triangles

- **Recognise the need for square kilometres and hectares to measure area**
- **Record areas using the abbreviations km2 and ha**
- **Develop a strategy to find areas of rectangles (including squares) and record the strategy in words**

Working Mathematically

- MA3-1WM - Describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions
- MA3-2WM - Selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations
- MA3-3WM - Gives a valid reason for supporting one possible solution over another

Assessment

Pre-Test
Post - Test

Learning Goal – Multiplication and Division
(refer to outcome)

Success Criteria – Multiplication and Division
(refer to indicators)

TIB – Multiplication forms the building block for other mathematical concepts. Multiplication and division can be applied to real life situations. For example: handling money, shopping, sharing things equally, cooking.

Learning Goal – Area (refer to outcome)

Success Criteria –Area (refer to indicators)

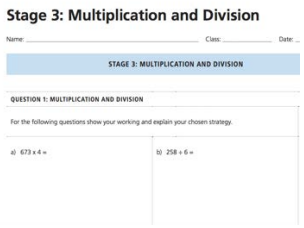
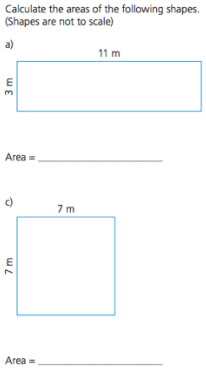
TIB – Area is used in many careers such as architecture, graphic design, engineering etc. You will use these skills when building a house. If you wish to lay tiles in your living room, halls and bedrooms, you need to calculate the area to determine how much flooring to purchase for the various size of your rooms.

Homework – iMaths

Alliera Carroll and Mel Reskic – Shell Cove Public School

Mathematics Weekly Plan

Term – 1 2 3 4 **Week –** 1 2 3 4 5 6 7 8 9 10 11 **Strands –** Multiplication and Division (1)/ Angles (1)

		Monday	Tuesday	Wednesday	Thursday	Friday
Key Ideas:		**Whole Number**			**Data**	
Warm Up		Maths Game	Ninja Maths	Ninja Maths	5 Minute Frenzy	5 Minute Frenzy
Problem of the Day		https://numeracyskills.com.au/resources/Stage_3_Diagnostics_Task_Job.pdf **Pre-test: Multiplication & Division:**  **Pre-test: Area:** How many square metres = 1 hectare (ha)? _____ m2 	*Toni bought 46 mini pizzas for a big party. Mini pizzas cost $3 each. How much did Toni have to pay?* $138	*Sally earns $6 pocket money for doing the dishes each day. How many days did she do the dishes, if she made $78?* *13 days*	*The library has 52 books. If each shelf can hold 13 books, how many shelves will the library need to hold all of its books?* *Subtraction ladder:* 52- 13 39- 13 26- 13 13- 13 00 = 4	**Post-test: Multiplication & Division:** *Open ended: Students write 2 by 2-digits at least multiplication and solve as well as a 2 by 3-digit division problem and solve using eh strategies that they learnt throughout the week.* **Post-test: Area:** *Conversions:* *27km2 = 2700ha* *842km2 = 84200ha* *8354ha = 83.54 km2* *53840ha = 538.4km2* *Open ended: Using the correct formula, draw a rectangle and square and find the area of each.*

Alliera Carroll and Mel Reskic – Shell Cove Public School

Explicit Teaching

Main Focus + *Language*

- Review Multiplication Strategies previously learned: Expanded method: = 32 x 4 = (30 x 4) + (2 x 4) = 120 + 8 = 128.
- Area model: 5 x 16 =

	10	6
5	50	30

50 + 30 = 80

- **Explicitly model multiplication and division problems:**
- Multiply 3-digit by 2-digit numbers using the extended form (long multiplication). Explain that the multiplication of a digit in the tens place value is multiplying by a multiple of ten and that is why we put the 0-place holder in the algorithm.

First step: Multiply the ones digit of the bottom factor (multiplier) by the top factor (multiplicand) and write the result on the line below.

781
x 95
3905

If we multiply 781 x 95, the first thing to do is to multiply by 5, which is in the ones place of 95, by each one of the digits of the top factor from right to left, and place the result, 3905, on the line below, as shown in the image.

Second step: Multiply the digit in the tens place of the bottom factor by the top factor and write the result on the line below, but place a 0 in the ones place, since this part of the multiplication is a number of tens.

781
x 95
3905
7029

We continue with the example. Now we multiply the 9, given that it is in the tens' place of the bottom factor 95, by the top factor 781. The result, 7029, will have to be written under 3905 but moved one place to the left.

Third step: Add the products.

781
x 95
3905
7029
74195

Add the products and the result of the multiplication is 74,195.

Extension: Demonstrate to students the steps to multiply a 3 by 3-digit number. If the bottom factor (multiplier) is a three-digit number, the result of the multiplication of the hundreds place will be followed by *two* 0s. Let's look at another example.

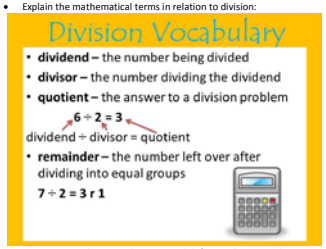
367
x 251
367
1835•
734••
92117

If we multiply 367 x 251, the first thing to do is to multiply the digit in the ones place of 251, which is 1, by 367. The result would be 367 and we put it on the line below. After we multiply the digit in the tens place of 251, which is 5, by 367. The result would be 1835 and we put it on the line below followed by a 0 in the ones place. Next we multiply the digit in the hundreds place of 251, that is to say, 2, by 367. The result would be 734 and we put it on the line below followed by a 0 in the tens place and a 0 in the ones place. Finally we do the addition, and the product is 92,117.

Additional examples to model:

45 x 63 | 97 x 41 | 36 x 56

- Division definition: Division is splitting into equal parts or groups. It is the result of "fair sharing".
- Explain the mathematical terms in relation to division:



- Encourage students to take notes and define each term in their workbooks.

Quotient
Divisor) Dividend

- Explicitly model simple division problems using 2 by 1-digit problems (formal algorithm) : Example:

h t o
0
4) 2 4 8

4 does not go into 2. You can put zero in the quotient in the hundreds place or omit it. But 4 does go into 24, six times. Put 6 in the quotient.

h t o
0 6 2
4) 2 4 8

The 2 of 248 is of course 200 in reality. If you divided 200 by 4, the result would be less than 100, so that is why the quotient won't have any whole hundreds. But then you combine the 2 hundred with the 4 tens. That makes 24 tens, and you CAN divide 24 tens by 4. The result 6 tens go as part of the quotient. Check the final answer: 4 × 62 = 248.

Additional examples to model:

a. 3) 123 b. 4) 284

c. 6) 360 d. 8) 248

- Division with remainders:

h t o
0 4 1 R1
4) 1 6 5

- 4 does not go into 1 (hundred). So combine the 1 hundred with the 6 tens (160).
- 4 goes into 16 four times.
- 4 goes into 5 once, leaving a remainder of 1.

th h t o
0 4 0 0 R7
8) 3 2 0 7

- 8 does not go into 3 of the thousands. So combine the 3 thousands with the 2 hundreds (3,200).
- 8 goes into 32 four times (3,200 ÷ 8 = 400)
  8 goes into 0 zero times (tens).
  8 goes into 7 zero times, and leaves a remainder of 7.

Additional examples to model:

a. 3) 128 b. 3) 95

c. 6) 4267 d. 4) 2845

- Continue modelling division strategies, both written and mental with no remainders:
- dividing the hundreds, then the tens, and then the ones, e.g. 3248 ÷ 4
  3200 ÷ 4 = 800
  40 ÷ 4 = 10
  8 ÷ 4 = 2
  Add all the answers together.
  So, 3248 ÷ 4=812
- Additional examples to model with no remainders:
  5/355
  8/168

- Model strategy dividing with remainders:
- dividing the tens and then the ones, e.g. 243 ÷ 4
  240 ÷ 4 = 60
  3 ÷ 4 = ¾ (becomes remainder, cannot divide 4 into 3)
  So, 243 ÷ 4 = 60 ¾
- Additional examples to model this method with remainders:
  6/634
  5/854

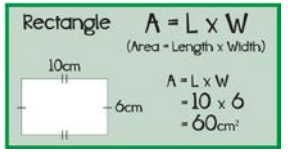
- Additional methods to assist in division of larger numbers: The **Subway or Subtraction Ladder strategy**. Example: **144 ÷ 24 = 6**
- Subway method: repeat addition of the divisor (24) until you reach the dividend (144). Count how many times you required to reach the dividend which will be the answer or the quotient of the dividend problem (6)
- Subtraction ladder: similar to subway method instead you take the divisor away from the dividend and continue until you reach 0. Modelled examples below:

24	(1)		144		
+24	(2)		- 24	(1)	
48			120		
+24	(3)		- 24	(2)	
72			96		
+24	(4)	OR	- 24	(3)	answer is 6
96			72		
+24	(5)		- 24	(4)	
120			48		
+24	(6)		- 24	(5)	
144			24		
			- 24		
			0		

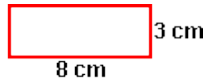
Examples to model using either strategy:

1. 90 ÷ 15 =
2. 56 ÷ 14 =
3. 175 ÷ 25 =

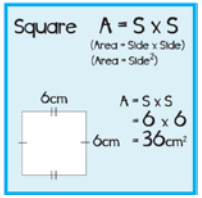
- Review units of length and measurement: Distance. How far from end to end. Or from one point to another.
- Access student's prior knowledge and discuss what area means: The size of a surface. The amount of space inside the boundary of a flat (2-dimensional) object such as a triangle or circle.
- Continue by asking what square centimetres means: The area equal to a square that is 1 centimetre on each side.
- Used for measuring small areas such as on drawings.
- The symbol is cm^2
- Example: An A4 sheet is 29.7 cm by 21 cm, so has an area of 623.7 cm^2.
- Explain that area is 2-dimensional, it has a length and a width. Area is measured in square units, example: cm2, m2 etc.
- Explain that the area of a rectangle can be found by multiplying the length by the width using a formula:
  To find the area of a rectangle, multiply the length by the width. The formula is:
  A = L x W where A is the area, L is the length, W is the width.



Example 2: A rectangle has a length of 8 centimetres and a width of 3 centimetres. Find the area.
Solution: A = L x W
A = (8 cm) **x** (3 cm) = 24 cm^2



- Model some more examples of areas of rectangles on the board by using any number for the length and width as well as using the above formula. Important to use squared as we are measuring the inside of the shape.
- Continue modelling area of a square.
- A Square is a flat shape with 4 equal sides and every angle is a right angle (90°). Therefore, when we are calculating the area, we need to multiply the length and width by itself (as they are the same number). Formula:



- Example: A square has a side length of 6 m, what is its Area? A = 6 m × 6 m = **36 m^2**
- Continue modelling examples on the board using the method for squares.

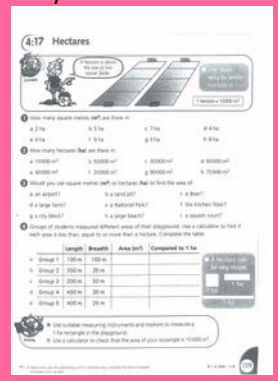
- Access student's prior knowledge of kilometres and hectares.
- **Kilometre and Hectare:** Ask students what they know about each measurement to access prior knowledge. Define each and encourage students to take notes in their books:
- **Square Kilometre (km2)**
- A square kilometre is **kilometre × kilometre**, which is written km^2. A kilometre is a thousand meters, so a square kilometre is also: 1,000 m × 1,000 m = 1,000,000 m^2 (square meters). In other words, a square kilometre is **one-million** square meters. Square kilometres are commonly used to measure **large** areas of land.
- Australia is **7.692 million km^2**

- **Hectare (ha)**
  A hectare (ha) is an area equal to a square that is 100 meters on each side. So, a hectare has 100 m × 100 m = 10,000 m^2 (square meters). Hectares are commonly used to measure land.
- Planning land for agriculture crops/farming.

- Convert between km2 and ha:
- **Square kilometres to hectares (km2 to ha)** area unit's conversion factor is 100. To find out how many hectares in square kilometres, multiply by the conversion factor.
- 1 Square Kilometre = 100 Hectares
- **There are 100 hectares in a square kilometre**, because a hectare is 10 000 square meters (100 m x 100 m = 10 000 m2) and one square kilometre is one million sq. meters (1000 m x 1000 m = 1 000 000 m2), that makes 1 000 000 / 10 000 = 100 hectares in a square kilometre.
- For example, to find out how many hectares there are in a square kilometre and a half, multiply the sq. kilometre value by 100, that makes 1.5 km2 x 100 = 150 hectares in 1.5 sq. kilometres.

- Further examples to model:
- 45km2 = 4500ha
- 63km2 = 6300ha
- 8340km2 = 834000ha
- 3748km2 = 374800ha
- 373ha =3.73km2
- 7380ha =73.8km2
- 23000ha =230 km2
- Note: remind students that the difference between the two measurements is a 100. They will either need to time (km2 to ha) or divide (ha to km2) their conversions to calculate.

Alliera Carroll and Mel Reskic – Shell Cove Public School

Group Activities	**Revision Group - Names**	Work with this group. Use sheet to provide ideas for questions to model and for students to answer in books. http://www.k5learning.com/worksheets/math/grade-4-multiply-columns-1-digit-3-digit-a.pdf	Work with this group. Use sheet to provide ideas for questions to model and for students to answer in books. http://www.k5learning.com/worksheets/math/grade-4-long-division-3x1-digit-with-remainder-a.pdf	Work with this group and solve division questions using the partition method. 258/2=129 632/4=158 2156/5=431 r2 412/5=82 r4 Continue to work with and extend students to use the ladder or subway method to solve the following: http://www.k5learning.com/worksheets/math/grade-4-long-division-with-remainder-within-1-100-a.pdf	**5/M Town Groups- Based on Continuum Clusters**	Work with this group to complete the following activity: 
Group Activities	**Middle Group- Names**	Group completes sheet independently. Mark answers after 10-15 minutes: https://www.math-drills.com/multiplication2/multiplication_long_no_tseparator_0202_001.pdf?v=1472647486	Group completes sheet independently. Mark answers after 10-15 minutes: https://www.math-drills.com/division/division_long_1dd2dq_nr_001.pdf?v=1360945853	Create cards with various 1 by 4-digit problems for the students to solve in their books using either the subway or the ladder method to solve: Examples of problems: 3 ÷ 2259 7 ÷ 2229 Extend students to 2 by 4-digits when they are ready (Main Group activity).	**5/6M Town Groups- Based on Continuum Clusters**	Group completes the following activity independently in their group: 
Group Activities	**Main Group - Names**	Group completes sheet independently. Mark answers after 10-15 minutes: https://www.math-drills.com/multiplication2/multiplication_long_no_tseparator_0404_001.pdf?v=1472647466	2 5,236 2. 7 1,204 Group completes sheet independently. Mark answers after 10-15 minutes: http://www.k5learning.com/worksheets/math/grade-6-division-by-1-digit-0-100000-with-remainder-a.pdf	Create cards with various 2 by 4-digit problems for the students to solve in their books using either the subway or the ladder method to solve: Examples of problems: 102 ÷ 17 = 182 ÷ 26 = 280 ÷ 56 = 304 ÷ 76 = 840 ÷ 56	**5/6M Town Groups- Based on Continuum Clusters**	Main group completes Activity 2: *Harrietville hectare puzzle* http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/cgvemaths/documents/4752_u32_measurement.pdf

Feedback/ Exit Slip	**Feedback –** Use the thumb method after explicit modelling to determine students understanding and where they will be placed for group activities. **Marking Exit Slips –** Next to each students **Exit Slip**, the teacher will check students answers and will either write an: **A** = Achieved **N/Y** = Not Yet **N/Y** students will become your target group.	Revision: 23 x 4 = 213 x 23 = Middle: 423 x 5 = 842 x 42 = Main: 234x 34 = 7623 x 425	Revision: 4÷720 4 ÷126 Middle: 2÷5236 7÷1204 Main: 8÷53849 6÷42509	*Students need to choose one of the strategies learnt throughout the session lesson to answer their division question:* Revision: 13 ÷95 28 ÷ 57 Middle: 434 ÷ 43 528 ÷ 73 Main: 375 ÷ 63 8352 ÷ 142	*Students draw either a rectangle or a square and using the correct formula, draw the area of their shape below. Open ended:* Revision: A= 16cm 2 Middle: A= 32cm2 Min: A = 86 cm2	Revision: 3km2 = 300ha 42km2 = 4200ha Middle: 34km2 = 3400ha 7183ha =71.83km2 Main: 532km2 = 53200ha 87457ha = 874.57km2
Early Finishes	• Students create a range of multiplication and division word problems for a friend to solve. Check answers using a calculator. This can be done using dice or decks of cards. • Students play division scoot and answer cards with a range of multiplication or division questions. • Students continue practicing their multiplication tables.				• Students create a variety of squares and rectangles for partners to investigate the areas for each. • Extend: students solve areas of irregular polygons: https://www.math-salamanders.com/image-files/free-4th-grade-math-worksheets-area-5.gif • Using Technology: Largest Area, or Longest Borders? *(Integrate in HSIE)* Students investigate: • *Which Australian state has the largest area?* • *Can you compare this with the state that has the smallest area?* • *Which state has the longest borders? Students explain how they calculated their answers.*	
Reflection/ Registration						