<table>
<thead>
<tr>
<th>Learning Goal – Multiplication and Division (refer to outcome)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Criteria – Multiplication and Division (refer to indicators)</td>
</tr>
<tr>
<td>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.</td>
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<tr>
<td>Learning Goal – Area (refer to outcome)</td>
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<td>Success Criteria – Area (refer to indicators)</td>
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<td>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.</td>
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<tr>
<td>Homework – iMaths</td>
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<td>Key Ideas:</td>
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<tr>
<td>Warm Up</td>
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**Problem of the Day**

- **Pre-test: Multiplication & Division:**
  - Stage 3: Multiplication and Division
  - Pre-test: Area:
    - How many square metres = 1 hectare (ha)? ______ m²

- **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
      - 39
      - 26
      - 13
      - 0 = 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 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.
Explicit Multiplication Strategies

- Review Multiplication Strategies previously learned.
- Expanded method: $ \text{xyz} \times \text{abc} = \text{ab} \times \text{xyz} + \text{bc} \times \text{xyz} + \text{ac} \times \text{xyz}$.
- Area model of $5 \times 6$.

Explicitly model multiplication and division problems:

- Multiply a digit by a digit numbers using the extended form (long multiplication). Explain that the multiplication of a digit at a particular 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, followed by a 0 in the tens place.

Next we multiply the digit in the hundreds 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 units place. Finally we do the addition, and put it on the line below followed by a 0 in the tens place, and then the ones, e.g. 3248 + 4 320 + 4 = 3200 + 10 = 3210. Add all the answers together.

$251 \times 367 = 92,167$

$3248 + 4320 + 4 = 7590$

$7590 + 3210 = 10,800$

Examples to model with no remainders:

- $53 \times 9 = 477$
- $12 \times 12 = 144$
- $24 \times 12 = 288$
- $36 \times 12 = 432$

Model strategy dividing with remainders:

- With the 2 hundreds (3,200).
- The hundreds place will be followed by a three-digit number, the result of the multiplication of a two-digit number 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

$251 \div 4 = 62.75$

$4 \times 62 = 248$ (is the result of “fair sharing”)

$7380ha = 73.8km^2$

$374ha = 3.74km^2$

$3748km^2 = 374800ha$

Further examples to model:

$2300ha \div 220ha = 10.5$

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.

Accessibility Support

- 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 and encourage students to take notes in their books.
- Square Kilometres (km2):
  - A square kilometre is a kilometre by a kilometre, which is written km². A kilometre is a thousand meters, so a square kilometre is also 1,000 x 1,000, or 1,000,000 m² (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 7.652 million km².
- Hectares (ha):
  - A hectare (ha) is an area equal to a square that is 100 meters on each side. So, a hectare has 100 x 100 = 10,000 square meters (square meters). Hectares are commonly used to measure land.
- Planning land for agriculture crops/fermitage.
- 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 100 square meters (100 m x 100 m = 10,000 m²) and one square kilometre is one million sq. meters (1,000,000 m x 1,000,000 = 1,000,000,000,000 m²), which makes 1,000,000 / 100 = 10,000 hectares in a square kilometre.
  - For example, to find out how many hectares there are in a square kilometre and a half, multiply the square kilometre value by 100, which makes 1.5 km² x 100 hectares = 150 hectares in 1.5 sq. kilometres.

Model and divide the area using unit squares.

- Example 1: An A4 sheet is 29.7 cm by 21 cm, so it has an area of 623.7 cm².
- 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: $A = l \times w$ where $l$ is the area, $l$ is the length, $w$ is the width.

$3 \times 3 = 9$

$9cm$.

$2400 = 2.400$m

$2.400 m = 2400cm$

$2.400 cm = 240mm$

$240mm = 0.240m$

$240cm = 2.400$m

$7380ha = 73.8km^2$

$374ha = 3.74km^2$

$3748km^2 = 374800ha$

$2300ha \div 220ha = 10.5$

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.

Model and divide the area using unit squares.

- Example 2: A rectangle has a length of 8 cm and a width of 3 centimetres. Find the area.
- Solution: $A = l \times w$

$A = 8 \times 3 = 24$ cm²

Conclusion: Continue modelling division strategies, both written and mental with no remainders:

- Model strategy dividing with remainders:

  - dividing the tens and then the ones, e.g. $243 \div 4$
  - $240 \div 4 = 60$
  - $3 \div 4 = 0.75$ (becomes remainder, cannot divide 4 into 3)
  - So, $243 \div 4 = 60.75$

- Additional examples to model this method with remainders:

  - $63/5 = 12.6$

- Additional methods to assist in division of larger numbers: The Subtraction or Division Ladder strategy.

- Subtraction 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 subtraction method instead you take the divisor away from the dividend and continue until you reach 0. Modelled examples below:

  - $24 \div 6 = 4$
  - $144 \div 24 = 6$
  - $100 \div 25 = 4$

- 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.
  - How to find the area of a rectangle, multiply the length by the width. The formula is: $A = l \times w$ where $l$ is the area, $l$ is the length, $w$ is the width.

- Subtraction Ladder strategy

  - Similar to subway or bus route:

- Concept of a square meter.

- $1m^2 = 10000cm^2$

- $1cm^2 = 0.0001m^2$

- $1m^2 = 10000cm^2$

- $1cm^2 = 0.0001m^2$

- $1cm^2 = 0.000001m^2$

- $1cm^2 = 1cm\times 1cm$

- $1m^2 = 100cm \times 100cm$

- $1cm^2 = 1cm \times 1cm$

- $1m^2 = 100cm \times 100cm$

- $1cm^2 = 1cm \times 1cm$

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- $1m^2 = 100cm \times 100cm$
| 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](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](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](http://www.k5learning.com/worksheets/math/grade-4-long-division-with-remainder-within-1-100-a.pdf) |
| --- | --- | --- | --- |
| Group Activities | Middle Group- Names | Group completes sheet independently. Mark answers after 10-15 minutes: [https://www.math-drills.com/multiplication2/multiplication_long_no_separator_0202_001.pdf?v=1472647486](https://www.math-drills.com/multiplication2/multiplication_long_no_separator_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](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). |
| Group Activities | 5/M Town Groups-Based on Continuum Clusters | Work with this group to complete the following activity: | Work with this group to complete the following activity independently in their group: | Main group completes Activity 2: Harrietville hectare puzzle [http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/cgymaths/documents/4752_u32_measurement.pdf](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/cgymaths/documents/4752_u32_measurement.pdf) |

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### 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 = | Revision: 4÷720 4 +126 | 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= 16cm²  
Middle: A= 32cm²  
Min: A = 86 cm² |
<table>
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<tbody>
<tr>
<td>234 x 34 = 7623 x 425</td>
<td>2+5236 7+1204</td>
<td>8+53849 6+42509</td>
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</tbody>
</table>

### Revision

<table>
<thead>
<tr>
<th>42 x 3 =</th>
<th>213 x 23 =</th>
<th>57 x 3 =</th>
<th>73 x 23</th>
</tr>
</thead>
<tbody>
<tr>
<td>42 x 3 =</td>
<td>213 x 23 =</td>
<td>57 x 3 =</td>
<td>73 x 23</td>
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### 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:
- 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

- 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:
- Using Technology: Largest Area, or Longest Borders? (Integrate in HSIE) Students investigate:
  - Which Australian state has the largest area?
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  - Which state has the longest borders? Students explain how they calculated their answers.