Stage 3 Maths Program

Term 1 **Week 3**

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
- Solve word problems and record the strategy used
- Use estimation to check answers to calculations

Angles (1) – relate to 3D Space

MA3-16MG - Measures and constructs angles, and applies angle relationships to find unknown angles

- Recognise the need for formal units to measure angles
- Measure, compare and estimate angles in degrees (up to 360°)

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

SENA 3 and 4 if you haven't completed in Week 1 and 2

Use SENA 1 and 2 if needed - IEP for these students

Learning Goal - Multiplication and Division (refer to outcome)

Success Criteria - Multiplication and Division (refer to indicators)

TIB - We need to learn these skills so that we can apply them to real life situations (handling money, sharing things with friends, cutting food into portions).

Learning Goal - Angles (refer to outcome)

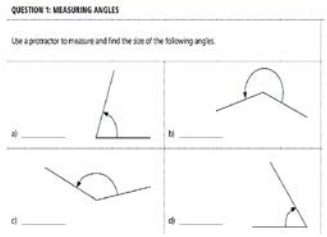
Success Criteria -Angles (refer to indicators)

TIB - Angles are used throughout geometry to describe shapes and to explain the behaviour of lines.

Homework - None this week

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		**Pre-Test: Multiplication & Division/ Angles**	Ninja Maths	Ninja Maths	5 Minute Frenzy	**Post-Test: Multiplication & Division/ Angles**
Problem of the Day		**Pre- test: Multiplication & Division:** • Write multiplication problems on the board and students will answer (one question at a time) individually on a whiteboard. • Record students who get answer wrong only (**focus/revision group**). • Begin with simple and then create extension questions. Questions below are examples: • 4 x 5 • 26 x 7 • 426 x 6 – correctly answered will become **main group.** **Pre-Test: Angles: Page 35** https://numeracyskills.com.au/resources/Stage_3_Diagnostics_Task_Job.pdf -  QUESTION 1: MEASURING ANGLES Use a protractor to measure and find the size of the following angles.	• Encourage students to use the *expanded method to solve: Chad bought 8 boxes of pens. There were 765 pens in each box. How many pens did Chad buy?*	• Encourage students to use the area method to solve: *If Riley eats 6 biscuits a day, how many does he eat over 94 days?*	• Encourage students to use long multiplication/ algorithm method to solve: *There are 47 squares on each red-and-white chequered tablecloth. How many squares are there on 4 tablecloths?*	**Post- test: Multiplication & Division: *Open ended:*** students will choose two strategies learned throughout the week and complete 2 x 1 or 3 x 1-digit problems (students will choose their own numbers but must have a minimum of 2 x 1-digit problems only e.g. 34 x 7). **Post-Test: Angles: *Open ended* –** students will use a protractor and draw 2 angles and name them according to type and degree.

Explicit Teaching

Main Focus + Language

- Introduce students to a range of mental and written strategies to multiply two, three- and four-digit numbers by one-digit numbers, including: using the expanded method of multiplication for multiplying the thousands, then the hundreds, then the tens and then the ones then adding the answers together.
- Quick revision of place value may be required e.g. 234 = 2 hundreds (200), 3 tens (30) and 4 ones/units.
- **Example 1:**
  = 32 x 4 = (30 x 4) + (2 x 4)
  = 120 + 8 = 128.
- Continue modelling more examples and ask students to contribute to answering questions.

Example 2: 213 x 5
Method:

- 213 is written as 200 + 10 + 3.
- Then multiply 5 by each of these numbers separately and add the products.
- The result is (200 x 5) + (10 x 5) + (3 x 5).

Answer:
= (200 x 5) + (10 x 5) + (3 x 5)
= 1000 + 50 + 5
= 1065

Example 3: 305 x 4
Method:

- 300 is written as 300 + 0 + 5.
- Then multiply 4 by each of these numbers separately and add the products.

The result is (300 x 4) + (300 x 0) + (300 x 5).
Answer:
= (300 x4) + (0 x 4) + (5 x 4)
=1200 + 0 + 20
=1200 + 20
=1220

- Model solving multiplication problems using the area model. Watch YouTube clip for simple demonstration: https://www.youtube.com/watch?v=qdYV6i-kXcA
- Explain to students that a way to multiply is to break numbers into smaller parts, or **decompose** numbers.
- Review the concept of decomposing numbers by place value (i.e. **12 = 10 + 2** or **36 = 30 + 6**).
- Ask students to decompose a few numbers with a partner and call on students to share answers (i.e. decompose: 82, 17, 24).
- Explain to the class that we are going to use what we know about area and decomposing numbers to multiply two-digit numbers.
- Write a two-digit times one-digit problem on board (i.e. **5 x 16**).
- Draw a rectangle on the board and explain that in this problem, the factors 5 and 16 are the length and width of the rectangle.
- Label the short side of the rectangle with 5.
- Then, tell students that since 16 is a two-digit number, it can be decomposed by place value (i.e. **10 + 6**) so that it is easier to multiply.
- Draw a line to divide the long side of the rectangle into two parts. Write 10 and 6 over the two divided parts so that you have a rectangle that has an area of **10 x 5** and one with an area of **6 x 5**.

	10	6
5		

- Multiply to find the area of each portion of the divided rectangle and write the product inside the corresponding piece of rectangle (i.e. 50 and 30).

	10	6
5	50	30

- Add the two **partial products** (parts of the total answer) to get the area of the entire rectangle, 50 + 30.
- Explain to your students that the answer to our multiplication problem, **16 x 5 is 80**.
- Write **16 x 5 = 80** below the area model.

	10	6
5	50	30

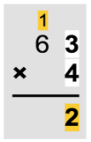
50 + 30 = 80.

- Model more examples using the area model and encourage students to assist in solving the problem e.g. 684 x 5 =

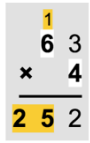
	600	80	4
5	3000	400	20

3000 + 400 + 20 = 3420

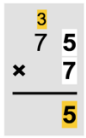
- Introduce students to written strategies e.g. long multiplication/written algorithm.
- Model examples on the board and encourage students to write steps as you go in their books.
- **Example 1:**
- 63 x 4:



- **Method:**
- Multiply the ones: 4 × 3 = 12
- Place 2 in the ones place, but write
- the tens digit (1) above the tens
- column as a little memory note. You are *regrouping* (or carrying).



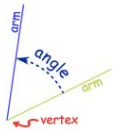
- Then multiply the tens, ***adding*** the 1 ten that regrouped.
- 4 × 6 + 1 = 25
- Write 25 in front of the 2. **Note** that 25 tens mean 250.
- **Example 2:**



- **Method:**
- Multiply the ones:
  7 × 5 = 35. Regroup the 3 tens.

- Multiply & add the tens:
  7 × 7 + 3 = 52.
- Write more examples on the board. Encourage students to answer using whiteboards.

- Revise students understanding of angles. Begin by encouraging students to draw an angle in their books using a ruler and label the parts of an angle.
- **Explicitly model: Parts of an Angle:** The corner point of an angle is called the **vertex.**
- And the two straight sides are called **arms.**
- The **angle** is the *amount of turn* between each arm.
- View image below from Maths is Fun.

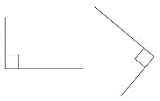


- Brainstorm student's prior knowledge of angles and discuss some of the types. Provide definitions for angles and ensure students record these in their books e.g. A right angle is an internal angle which is equal to 90 degrees.

- **Examples:** https://www.mathsisfun.com/angles.html

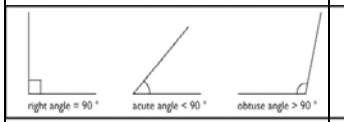
Type of Angle	Description
Acute Angle	is less than 90°
Right Angle	is 90° exactly
Obtuse Angle	is greater than 90° but less than 180°
Straight Angle	is 180° exactly
Reflex Angle	is greater than 180°
Full Rotation	is 360° exactly

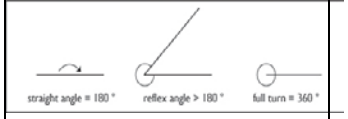
- https://education.nsw.gov.au/teaching-and-learning/student-assessment/smart-teaching-strategies/numeracy/measurement-geometry/2d/Stage-3-space-and-geometry-2D
- Using an example, point out the right angle and tell students that this square tells you that the type of angle is a right angle and the number tells you the angle size (90). Angles are measured in degrees (°). So, a right angle is 90°. All the angles below are right angles.

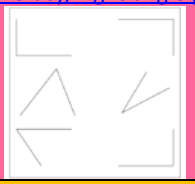
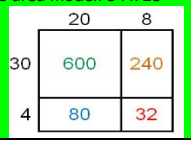


- Show students that a right angle can be in any orientation or rotation as long as the internal angle is 90°.
- Test students by calling out a degree of an angle they need to name and define e.g. 130 = obtuse, greater than 90 and less than 180 etc.

- Discuss and list the features of a protractor, e.g. they all have a baseline, a centre marked on the baseline, a scale beginning at 0°.
- Most protractors have two scales, one on the inside of the curve and one on the outside of the curve. Each scale goes from 0° to 180°.
- Model how to construct other angles using the hovercam and a protractor. Use the following website to assist in helping you how to explicitly model. Use some of the following examples for students to complete independently. https://www.slideshare.net/adamharbot/constructing-an-angle-or-triangle-using-a-protractor
- Ensure to explain to students that when using a protractor, remember to place the middle of your protractor directly on the vertex of the angle, and then line up the 0° point on the outer edge along one of the rays (or arms) of the angle. Take care that you read the numbers that start from the 0° and go forwards, not backwards around from 360°.
- Students practice measuring angles using a protractor by following these steps:
- Place the protractor over the angle to be measured.
- Move the protractor so the center of the baseline is on top of the vertex of the angle.
- Make sure the baseline is on top of one arm of the angle.
- Hold the protractor carefully so it does not move.
- Count forwards from 0° along the scale until you reach the other arm of the angle.
- The number where this arm crosses the scale tells you the size of the angle in degrees.
- Ensure to label the angle in terms of its degrees and its name e.g.





Group Activities	**Revision Group - Names**	Work with this group. Students use deck of cards and pull 2 by 1 (2 x 1 digits) cards out at a time to create a range of multiplication problems and answer them using the expanded method. Students extend themselves to the next level when confident.	Work with this group. Students use deck of cards and pull 2 by 1 (2 x 1 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using the expanded method. Students extend themselves to the next level when confident.	Work with this group. Students use deck of cards and pull 2 by 1 (2 x 1 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using long multiplication/algorithm method. Students extend themselves to the next level when confident.	**5/6M Town Groups - Based on Continuum Clusters**	Work with this group. Using the angle sheets from the website, work with this group to use protractors to correctly measure the angles. https://education.nsw.gov.au/teaching-and-learning/student-assessment/smart-teaching-strategies/media/documents2/numeracy/Right-angle.pdf 
Group Activities	**Middle Group- Names**	Students use deck of cards and pull 3 by 1 (3 x 1 digits) cards out at a time to create a range of multiplication problems and answer them using the expanded method. Students extend themselves to the next level when confident.	Students use deck of cards and pull 3 by 1 (3 x 1 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using the expanded method. Students extend themselves to the next level when confident.	Students use deck of cards and pull 3 by 1 (3 x 1 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using long multiplication/ algorithm method. Students extend themselves to the next level when confident.	**5/6M Town Groups - Based on Continuum Clusters**	**Constructing Angles:** In pairs, students draw ten different angles for each other. Students then measure, label and order their partner's drawings.
Group Activities	**Main Group – Names**	Students use deck of cards and pull 3 by 3 (3 x 3 digits) cards out at a time to create a range of multiplication problems and answer them using the expanded method. Students extend themselves when confident e.g. 4 by 3 etc.	Students use deck of cards and pull 3 by 3 (3 x 1 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using the area method. Students extend themselves when confident e.g. multiplying 2-3-4-digit numbers by 2 using area model (modelling of this will be required) e.g. of 2 by 2 multiplication using the area model: 34 x 28 	Students use deck of cards and pull 3 by 3 (3 x 1 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using long multiplication/ algorithm method. Students extend themselves when confident e.g. multiplying 2-3-4-digit numbers by 2 using long multiplication/ algorithm method. (modelling of this may be required) e.g. of 2 by 2 multiplication using the area model: 34 x 28 3 by 2: 324 x 75	**5/6M Town Groups - Based on Continuum Clusters**	**Constructing Angles:** In pairs, students draw ten different angles for each other. Students then measure, label and order their partner's drawings.
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 Group –** 26 x 3 = 20 x 3 + 6 x 3 = 60 + 18 = 78 **Middle Group –** 45 x 5 = 40 x 5 + 5 x 5 = 200 + 25 = 225 **Main Group –** 86 x 9 = 80 x 9 + 6 x 9 = 720 + 54 = 774	**Revision Group –** 62 x 4 = 248 **Middle Group –** 73 x 6 = 438 **Main Group –** 735 x 6 = 4410	**Revision Group –** 25 x 6 = 150 **Middle Group –** 66 x 5 = 330 **Main Group –** 83 x 7 = 581	**Revision Group –** Write a definition of an angle and its degree. **Middle Group –** Write a definition of an angle and its degree. **Main Group –** Write a definition of an angle and its degree.	**Revision Group –** Draw and label a right angle and explain why it is that angle e.g. because it is above or below … **Middle Group –** Draw and label an acute angle explain why it is that angle e.g. because it is above or below … **Main Group –** Draw and label an obtuse angle explain why it is that angle e.g. because it is above or below …

Early Finishers/ Extension	• Students will practice their times tables based on personal learning goals/needs. • Students will work either in pairs/individually and use whiteboards to practice. Students can rotate between writing their tables out as well as reciting them aloud. **Extension:** Students use mental and/or written strategy learned throughout the week and multiply 4 by 4-digit numbers.				**Angling:** • In pairs, students take turns to nominate the size of an angle to create e.g. 50º. Both students estimate and draw an angle of the nominated size. Students use a protractor to measure their partner's angle. The student whose angle is closer to the nominated measurement is the winner. **Variation:** Students create two sets of cards, one with a range of angles drawn on them and the other with the measured size of the angles. They play a concentration game with the cards.	
Reflection/ Registration/ Feedback						