

Stage 3 Maths Program

Term 2 Week 9

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 divide numbers with three or more digits by a one-digit operator, including problems that result in a remainder
- Use the formal algorithm for multiplication by one- and two-digit operators

Angles (1) – relate to 3D Space

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

- Record angle measurements using the symbol for degrees ($^{\circ}$)
- Construct angles using a protractor (up to 360°)
- Describe angle size in degrees for each angle classification

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

Learning Goal - Multiplication and Division (refer to outcome)

Success Criteria - Multiplication and Division (refer to indicators)

TIB -

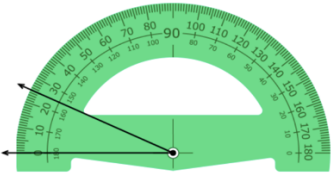
Learning Goal - Angles (refer to outcome)

Success Criteria -Angles (refer to indicators)

TIB -

Mathematics Weekly Plan

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

		Monday	Tuesday	Wednesday	Thursday	Friday
Key Ideas:		Multiplication and Division			Angles	
Warm Up	Additional warm up activities: TEN: Using your PLAN Data, students will work on TEN based activities for 10 minutes. Activities are differentiated based on group needs (view PLAN Data/Clusters).	Mark Pre-test as a whole class and provide immediate feedback.	TEN/ Ninja Numeracy/ Quick Revision Mentals	TEN/ Five Minute Frenzy/ Quick Revision Mentals	TEN/ Five Minute Frenzy/ Quick Revision Mentals	Mark Post-test as a whole class and provide immediate feedback.
Problem of the Day		Pre-Test: Multiplication & Division and Angles.	<p><i>Cheryl has 54 Skittles stored in boxes. If there are 6 boxes, how many Skittles must go in each box?</i></p> <p><i>There are 240 marbles in Kathryn's marble collection. If the marbles are organized into 40 groups, how big is each group?</i></p>	<p><i>A restaurant purchased 72 boxes of sauce packets. Each box contained 43 packets of sauce. How many ketchup packets in total did the restaurant purchase?</i></p>	 <p><i>Place images on board where students have to read off a protractor to find the measurements of various angles. Students will also need to measure and label the angle according to its type e.g. acute.</i></p>	Post-Test: Multiplication & Division and Angles.

Main Focus + Language

Revision: Revise short division with the students. Begin with no remainders than include questions with remainders. Remind students that division is calculating how many times a number 'goes into' another. The answer after the division is called the quotient.

YouTube Clip showing students visual of the steps to divide:

https://www.youtube.com/watch?v=usb_6M2CgGE

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

$$\begin{array}{r} \text{h t o} \\ 0 \\ 4 \overline{) 248} \end{array}$$

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.

$$\begin{array}{r} \text{h t o} \\ 062 \\ 4 \overline{) 248} \end{array}$$

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: $4 \times 62 = 248$.

Additional examples to model:

$$\begin{array}{ll} \text{a. } 3 \overline{) 123} & \text{b. } 4 \overline{) 284} \\ \text{c. } 6 \overline{) 360} & \text{d. } 8 \overline{) 248} \end{array}$$

- Encourage students to do the inverse operation to ensure that their answers are correct.
- Division with remainders: *solve the remainder mentally and simply write the remainder right after the quotient:*

Revision: Revise how to complete multiplication problems with the students. Remind students in order to perform multiplication, move from right to left and carry the tens when the answer is greater than 9. Use the following tips to explicitly model multiplication of 2 by 1 and 2 by 2-digit numbers to students:

- multiply the first numbers together and write the answer.
- If the answer is greater than 9 write the "units" digit then the tens digit above the numbers in the column to the left.
- Then repeat the multiplication but then add the figure above in your calculation, repeat the process until you are finished.
- Write a 0 (zero) in the second row before you start to multiply the tens digit.
- When the two rows are completed you will have to add them. So, carry the tens above the two rows.

Model 22 x 43:

Use the bottom one's number and multiply it by the ones number directly above it. Write the result directly below the line. $3 \times 2 = 6$.

$$\begin{array}{r} 22 \\ \times 43 \\ \hline 66 \end{array}$$

Use the same bottom number and multiply it by the top tens number. Then write the result under the line so it's directly below the tens space. You'll now need to multiply 3 by the other 2 to get 6. The number under your line should be 66.

$$\begin{array}{r} 22 \\ \times 43 \\ \hline 66 \end{array}$$

Before you begin multiplying the next part, place a zero under the ones place. This will hold the space so you can

- Use this modelled lesson to revise any content (*division or multiplication*) that students require the most support in.
- Use word problems to continue modelling mental and written strategies for division and multiplication:

Examples of word problems to explicitly model on the board:

A group of 157 dancers are organised into groups of nine. How many full groups of nine can be created?

In an office, there are 9 desks. A pack of 135 sets of sticky notes need sharing equally among the desks. How many sets of sticky notes are on each desk?

Vera did sit-ups for 99 days in a row. She did 82 sit-ups per day. How many sit-ups did Vera do?

$$\begin{array}{r} 99 \\ \times 82 \\ \hline 198 \\ + 7,920 \\ \hline 8,118 \end{array}$$

Vera did 8,118 sit-ups.

There are 57 boxes of books in the storeroom. Each box has 63 books. How many books are there in all?

$$\begin{array}{r} 57 \\ \times 63 \\ \hline 171 \\ + 3,420 \\ \hline 3,591 \end{array}$$

There are 3,591 books in all.

Examples links of division and multiplication word problems:

<https://www.dadsworksheets.com/worksheets/word-problems-mixed-multiplication-and-division-word-problems.html>

<https://au.ixl.com/math/year-5/division-facts-to-12-word-problems>

Revision: access prior knowledge of angles and encourage students to share the type and descriptions of what they have remembered.



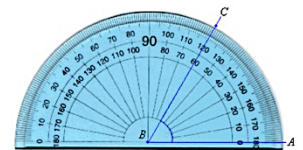
Type of Angle	Description
Acute Angle	is less than 90°
Right Angle	is 90° exactly
Obtuse Angle	is greater than 90° but less than 180°
Straight Angle	is 180° exactly
Reflex Angle	is greater than 180°
Full Rotation	is 360° exactly

- Angles are measured in *degrees*. The symbol for degrees is a little circle °.
- The FULL CIRCLE is 360° (360 degrees).
- A half circle or a straight angle is 180°.
- A quarter circle or a right angle is 90°.
- Review how to measure angles using the hovercam using a protractor.
- Example 1:** Place the midpoint of the protractor on the VERTEX of the angle.
- Line up one side of the angle with the zero line of the protractor (**where you see the number 0**).
- Read the degrees where the other side crosses the number scale.
- Take care to read from the right set of numbers. A protractor has two sets of numbers: one set goes from 0 to 180, the other set from 180 to 0. Which one you read depends on how you place the protractor: **place it so that one side of the angle lines up with one of the zeros and read that set of numbers.**

Explicitly model how to construct angles using the degrees symbol. Drawing Angles less than 180° with a Protractor:

- To draw an **angle** with a **protractor**, proceed as follows:
- Draw a straight line (i.e. an arm of the angle).
- Place a dot at one end of the arm. This dot represents the **vertex** of the angle.
- Place the centre of the protractor at the vertex dot and the baseline of the protractor along the arm of the angle.
- Find the required angle on the scale and then mark a small dot at the edge of the protractor.
- Join the small dot to the vertex with a ruler to form the second arm of the angle.
- Label the angle with capital letters.

Example 1: Explicitly model using the hovercam: draw an angle that = 60 degree using a ruler and a protractor and writing the correct symbol. Ensure to continue modelling the correct labelling of the type of angle – *60 degrees would be an acute angle as it is less than 90 degrees.*



- Begin by drawing a straight-line using a ruler and labelling them as AB.
- Place a dot at B. This dot will represent the vertex of the angle so we know where to line up the protractor.
- Place the centre of the protractor at B and the baseline of the protractor along the arm BA.
- Find 60° on the scale (starting from zero and following around the protractor until you hit the targeted amount) and mark a small dot at the edge of the protractor.

$$\begin{array}{r} \text{h t o} \\ 041\text{R}1 \\ 4 \overline{) 165} \end{array}$$

- 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.

$$\begin{array}{r} \text{th t o} \\ 0400\text{R}7 \\ 8 \overline{) 3207} \end{array}$$

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

begin multiplying the bottom tens number. So, if you've got 66 as your first result, put a 0.

$$\begin{array}{r} 22 \\ \times 43 \\ \hline 66 \\ 880 \end{array}$$

Now that you've already worked the bottom ones number, multiply the bottom tens number by the top ones number. Write the result next to the zero you wrote. $4 \times 2 = 8$, so write an 8 in the tenths column next to the 0.

$$\begin{array}{r} 22 \\ \times 43 \\ \hline 66 \\ 80 \end{array}$$

Write the result next to the number you just wrote down. 4×2 , write another 8 next to the 80 you already have written down.

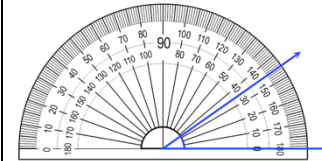
$$\begin{array}{r} 22 \\ \times 43 \\ \hline 66 \\ 880 \end{array}$$

If your numbers don't have any more digits, you're ready to add both rows of your results. The number you get will be the answer. Add $66 + 880$ to get 946.

$$\begin{array}{r} 22 \\ \times 43 \\ \hline 66 \\ + 880 \\ \hline 946 \end{array}$$

Additional examples to explicitly model:
 32×4
 83×5

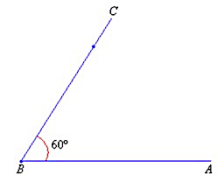
http://www.math-aids.com/Word_Problems/



- The above image represents a modelled examples of measuring an angle. Ensure to point across the straight line to the vertex to ensure students understand that the centre of the protractor needs to be on that point.
- Starting from zero, move your finger along until you reach the other line of the angle. Carefully read what angle it lays on and ensure to write the angle using the degree symbol and also identify as the type of the angle = 35° , acute angle.
- Using the following link, continue modelling angles on the hovercam using a protractor.

<https://education.nsw.gov.au/teaching-and-learning/student-assessment/smart-teaching-strategies/media/documents2/numeracy/Right-angle.pdf>

- Join the vertex B to the small dot with a ruler to form the second arm, BC , of the angle.
- Mark the angle with a small arc as shown below.



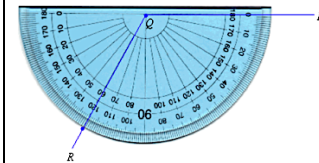
Additional examples to model (measure and draw):

- 65°
- 129°
- 180°
- 88°
- 167°
- 90°

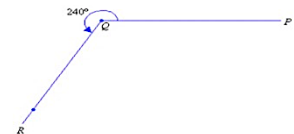
Extension: Constructing and measuring Reflex Angles

To draw a reflex angle (i.e. angle greater than 180° and less than 360°), proceed as follows:

- Subtract the reflex angle from 360° . Then draw the resulting angle as described earlier.
- The required angle is outside the one that has been drawn.
- Mark the angle with a small arc.
- Label the angle.



- Then remove the protractor and join the vertex, Q , to the small dot with a ruler to form the second arm, QR , of the angle.
- Mark the angle with a small arc as shown below.



			73 x 27 82 x 26			
Group Activities	Revision Group - Names	Work with this group. Using cards or dice, create 3 by1-digit numbers to divide, begin with no remainders. Students should use whiteboards as well as their notebooks to take down examples. After time increase the numbers when students are confident and include remainders.	Work with this group. Using cards or dice, create 2 by1-digit numbers to multiply. Students should use whiteboards as well as their notebooks to take down examples. After time increase the numbers. Extend students to 2 by 2-digits when confident.	Provide group with a range of multiplication and division word problem task cards. Work with Revision group and monitor Middle group. Use the above links to get examples for task cards for Revision and Middle groups.	5/6M Town Groups Based on Continuum Clusters	Work with this group to measure and construct angles. Do this in 10-minute rotations: first focus on reading and labelling, then work on constructing. Ensure students use a protractor and ruler when creating. Example angles to measure: https://www.mathworksheets4kids.com/angles/measuring/standard-type1-easy1.pdf
Group Activities	Middle Group- Names	Create cards with various 1 by 4-digit problems for the students to solve in their books using chosen written and mental strategies. Include non-remainders and remainders. Example: $2258 \div 4$ $3724 \div 8$ Move students onto extension 2 by 4-digit when confident.	Students use deck of cards and pull 3 by 2 (3 x 2 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using long multiplication/ algorithm method. Example: 382×27 . Students extend themselves to the next level when confident.		5/6M Town Groups Based on Continuum Clusters	Students work together to construct a variety of angles using a ruler and a protractor. These can be in the form of a work sheet or task cards. Students will get a partner to check if they have constructed the angle correctly. Example of worksheet: http://www.math-aids.com/cgi/pdf_viewer_4.cgi?script_name=angles_drawing.pl&language=0&memo=&answer=1&x=182&y=17 When students are confident, students can work on Main activity – reflex angles.
Group Activities	Main Group – Names	Create cards with various 2 by 4-digit problems for the students to solve in their books using chosen written and mental strategies. Include remainders: Examples of problems: $102 \div 17 = 182 \div 26 = 280 \div 56 = 304 \div 76 = 840 \div 56 =$ Extend students by providing examples involving decimal numbers: $0.539 \div 0.11 = 04.9$ Example link to assist in modelling: http://www.math.com/school/subject1/lessons/S1U11.6DP.html	Students use deck of cards and pull 4 by 3 (4 x 3 digits) cards out at a time/ roll dice to create a range of multiplication problems and answer them using long multiplication/ algorithm method. Example 3845×283 . Students extend themselves by adding in decimals, e.g. 73.45×29.3	Provide group with open ended word problems. Ensure to include examples with decimals for both multiplication and division.	5/6M Town Groups Based on Continuum Clusters	Students work independently to measure and construct a variety of reflex angles. (a) 190° (b) 209° (c) 248° (d) 251° (e) 225° (f) 217° (g) 195° (h) 236° Extension: Students independently measure angles inside various 2D shapes. Example link: https://www.mathworksheets4kids.com/angles/measuring/shapes1.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: 4/461 Middle: 5/8268 Main: 36/37279	Revision: 14 x 6 Middle: 23 x 67 Main: 489 x 384	<i>Students write a reflective exit slip in terms of division and multiplication: What can you do well with little to no help? What do you still need help with?</i>	<i>Each student gets a friend to construct an angle for them. Students then measure using a protractor and label angle according to degree and type.</i>	<i>Construct the following angle:</i> Revision: 80-degree angle (acute) Middle: 140-degree angle (obtuse) Main: 286-degree angle (reflex)

Early Finishers/ Extension	<p>Students create a range of multiplication and division word problems for a friend to solve. Check answers using a calculator/inverse operation. This can be done using dice or decks of cards.</p> <p>Students play division scoot and answer cards with a range of multiplication or division questions.</p> <p>Students continue practicing their multiplication tables</p> <p>I Have Who Has – multiplication and division game: https://www.superteacherworksheets.com/division/division-ihavewhohas2.pdf</p> <p>Students complete: iMaths or Mathletics worksheets based on the topic.</p>				<p>Students create various 2D Shapes with specific angles that they have to measure and label.</p> <p>Students create a variety of angles for a partner and they have to measure and label the angle.</p> <p>I Have Who Has – angle game: https://www.teacherspayteachers.com/Product/I-have-who-has-game-for-measuring-angles-with-a-protractor-89915</p> <p>Students complete: iMaths or Mathletics worksheets based on the topic.</p>	
Reflection/ Registration/ Feedback						