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| **MATHEMATICS** |  |  |  **STAGE 3** |
| **TEACHING AND LEARNING OVERVIE****W** |
| **TERM:** | **WEEK: 10** | **STRAND:** NUMBER & ALGEBRA | **SUB-STRAND:** Multiplication & Division 2 | **WORKING MATHEMATICALLY:**MA3-1WM, MA3-2WM, MA3-9MG |
| **OUTCOMES: MA3-6NA** |  **Select and apply mental and written strategies, and appropriate digital technologies, to solve problems involving multiplication and division with whole numbers (ACMNA123).** |
| **CONTENT:** | **Select and apply efficient mental and written strategies, and appropriate digital technologies, to solve problems involving multiplication and division with whole numbers*** **Use mental strategies to multiply and divide numbers by 10, 100, 1000 and their multiples.**
* **Solve word problems involving multiplication and division.**
* **Use appropriate language to compare quantities, eg ‘twice as much as’, ‘half as much as’.**
* **Use a table or similar organiser to record methods used to solve problems.**
* **Recognise symbols used to record speed in kilometres per hour, eg 80km/h**
* **Solve simple problems involving speed, eg ‘How long would it take to travel 6ookm if the average speed for the trip is 75km/h?’**
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| **ASSESSMENT FOR LEARNING**(PRE-ASSESSMENT) |  Worksheet – **Multiplication pre-test using the extended form of the multiplication algorithm to multiply two- and three-digit numbers by two-digit numbers and related word problems.** |
| **WARM UP / DRILL** |  **Various multiplication and division fact drills:*** **Multiples – Count by any number to practise calculating multiples**
* **Multiplication Buzz**
* **Speed tests e.g. multiplication webs, tables challenge**
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| **TENS ACTIVITY****NEWMAN’S PROBLEM** |   What happens if you multiply a number by a multiple of ten? ❚ What happens if you divide a number by a multiple of ten? ❚Can you devise a strategy for multiplying by a multiple of ten? ❚ Can you devise a strategy for dividing by a multiple of ten? |
| **QUALITY TEACHING ELEMENTS** | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| □     Deep knowledge□     Deep understanding□     Problematic knowledge□     Higher-order thinking□     Metalanguage□     Substantive communication | □     Explicit quality criteria□     Engagement□     High expectations□     Social support□     Students’ self-regulation□     Student direction | □     Background knowledge□     Cultural knowledge□     Knowledge integration□     Inclusivity□     Connectedness□     Narrative |
| **RESOURCES** |  Octagonal spinners, number pattern tables, supermarket brochures, exchange rates http://.www.superteacherworksheets.com/mean-median-mode-range/bowling-averages\_TWTMW.pdf |

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| **WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES** | **GUIDED & INDEPENDENT ACTIVITIES** |
| * **Explicitly teach** the procedure for calculating the mean and average speed; Multiplication and Division by 10 and multiples of ten: Division with zero in the quotient.

Reinforce the units used for speed, time and distance.* **Define and reinforce metalanguage** used in the unit: eg estimation, average, average speed, mean ,arithmetic average, constant speed, divide, sum, quantities, exchange rate, , tally, table, strategy, quotient, solve, divisor, dividend, multiplier, distribution, multiples.
* **IWB**

**Super teacher worksheets** Find the averages of the bowling scores (requires long division) | **LEARNING SEQUENCE**RemediationS2 or Early S3 | * **Mental and Digital multiplication and Division**

Spin, Estimate and Check Students make two octagonal spinners, one with three-digit numbers within a given range (eg 850 to 950) and the other with the numbers 2 to 9. Student A spins the two spinners and estimates the answer when the three-digit number is divided by the single-digit number. eg 920 ÷ 7 is about 130. Student B checks the answer on a calculator. Student A scores 1 point if their estimate is 21 or more away from the answer, 2 points if their estimate is 11 to 20 away from the answer and 3 points if their estimate is 10 or less away from the answer. Students swap roles. Students take turns and keep a tally of their scores. The game continues until one student scores 20 or more points. Variation: Students could repeat the activity for multiplication.**Revise** formal procedures for multiplication and division. |
| **LEARNING SEQUENCE****S3** | * **Introduction**

Division Webs Students create web patterns using three- or four-digit numbers. They draw the web with multiplication facts on one side and division facts on the back. Students swap their webs with a partner and write the answers in the outer web. They check the answers with a calculator. Variation: Students create multiplication or division webs using large numbers.**Whole Class Instruction and Modelled Activities*** Number Patterns **Investigation**

Students are given a table such as:They are asked to continue the pattern and describe the number pattern created. Students are encouraged to create further number patterns and are given access to a calculator.* Further number patterns involving multiplying and dividing by multiples of 10.

Possible questions include:❚ What happens if you multiply a number by a multiple of ten? ❚ What happens if you divide a number by a multiple of ten? ❚Can you devise a strategy for multiplying by a multiple of ten? ❚ Can you devise a strategy for dividing by a multiple of ten?Solve multiplication and division algorithms involving zero eg dividing 4-digit numbers by 10; division with zero in the quotient.* **Problem Solving Investigation**
* Value for Money: Students collect supermarket brochures advertising weekly sales. Students investigate prices (eg 4 ice-blocks for $2.95 or 6 ice-blocks for $3.95), in order to recommend the best buys. Possible questions include: ❚ can you explain the best buy? Why is it the best buy? ❚ How did you work it out? ❚Is there a better strategy you could use to work it out? .
* Averages: Introduce the term mean as the arithmetic average. Students calculate averages related to a range of everyday situations eg temperature, heights of students. Students investigate open-ended questions eg if the average height of 3 students is 140 cm, what are possible heights for each of the students?
* Introduce the term average speed. Emphasise that this is not the average of several speeds. This is the speed at which you would need to travel to complete a journey if it were possible to maintain constant speed. Discuss the units used for speed: km/h, cm/min, km/day, m/s Solve problems involving average speed applying formula. eg I travelled from my home to Melbourne, a distance of 186 km, in 3 hours. What is my average speed? Introduce formula and locate time, distance travelled.

Assessment: Problem solving relating to those treated involving multiplication and division. |
| **LEARNING SEQUENCE**ExtensionEarly S4 | * Students collect a variety of brochures and rate prices according to value for money.
* Students collect data on the exchange rate of the Australian dollar (AUD), petrol prices or the distribution of newspapers over a week, and determine averages. Students experiment with other ways of representing the information.
* Students solve more challenging problems involving speed, time and distance.
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| **EVALUATION & REFLECTION** |  Student engagement: Achievement of Outcomes Resources Follow-up |

     All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.

     Assessment rubrics or marking scale should be considered.