|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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?’** | | |
| **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** | | |
| **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 | | |

|  |  |  |
| --- | --- | --- |
| **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**    Remediation  S2 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**  Extension  Early 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. |
| **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.