**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: 2 | WEEK: 10 | STRAND: Number and Algebra | **SUB-STRAND:** Patterns and Algebra 2 | **WORKING MATHEMATICALLY:** MA2-1WM, MA2-2WM, MA2-3WM |
| OUTCOMES: MA2-2WM | **Selects and uses appropriate mental or written strategies, or technology, to solve problems** |
| **CONTENT:**  | **Solve word problems by using number sentences involving multiplication or division where there is no [remainder](http://syllabus.bos.nsw.edu.au/glossary/mat/remainder/?ajax" \t "_blank" \o "Click for more information about 'remainder')*** complete number sentences involving multiplication and division by calculating missing numbers
* represent and solve multiplication and division word problems using number sentences, eg 'I buy six pens and the total cost is $24. What is the cost of each pen?
 |
| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Use missing number worksheet to see correlation between multiplication and division.

  |
| WARM UP / DRILL | * **Multiplication Bingo**
* Provide each student with a 4X4 grid
* Students write products from 1X1 up to 10X10 in each square
* Roll ten sided dice twice, multiply numbers together
* Students cross off the answer on grids
* First with four in a row win – any direction

 |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | I buy six pens and the total cost is $24. What is the cost of each pen? |
| 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 | Hundreds chart, multiplication grid, array flash cards, word problems worksheet, word problem bingo.All worksheets are linked, double click on icon. |

**TEACHING AND LEARNING EXPERIENCES**

|  |  |
| --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * Explicitly communicate lesson outcomes and work quality.
* **Teach and review** Students need to be explicitly taught numerous strategies before they can use multiplication as an operation and recognise division as its opposite operation, for example, skip counting, repeated addition and forming arrays to represent multiplication.

Define and reinforce metalanguage used in the lessons eg multiply, multiplied by, lots of, groups of, repeated addition, add, total, equals | LEARNING SEQUENCERemediationS1 or Early S2 | * **Counting Patterns** - Students are divided into two groups. A hundreds chart is displayed. Class counts by 5s to 100 referring to hundreds chart. As they count groups take turns to name the next number in the sequence Eg. Group 1- 5, Group 2- 10, etc. What do you notice about the numbers we are saying?
* Have 10 cards of alternating colours, each one showing a different decade in the range 1-100. Arrange the cards in rows of 20. Have the students discuss any patterns that they are able to identify in this chart.

Focus the students’ attention to the column showing the following sequence, 10, 30, 50, 70, 90. Ask the students the following questions.What are the next 3 numbers in the sequence?How are you working them out?How would you describe this sequence?* Repeat the above activity with sequences from other columns in the chart.
* Place the cards into four rows, with 1 to 25 in the top row, 26 to 50 in the next etc. Identify and discuss the visual arrangement of various sequences.
 |
| LEARNING SEQUENCES2 | * Developing Computational Skills
* **Hundreds Chart** - Have students look for different number patterns on a hundreds chart when counting by 3, 4, 5, 6 etc. Use counters to show the patterns. If counting by 4s, for example, students should count 1, 2, 3 and cover the number using a counter, repeating this for a few rows until they can see a pattern and can continue it for the whole chart. Ask students to describe the patterns that have been made, e.g. multiples of 3 make a diagonal pattern, multiples of 5 make a vertical pattern.

Pairs of students are given a number from 2 to 10 and asked to find the pattern for their number on the hundreds chart.* **Multiplication Grid -** This activity provides students with a holistic view of multiples (times tables) and assists students in seeing the reciprocal nature of multiples. For example, if I know that 3 x 7 is 21 then I also know that 7 x 3 is 21. Demonstrate how the grid can be used for division.
* **Whisper or stress counting -** The teacher leads the class in counting by whispering the numbers not in the sequence and emphasising those that are part of the number pattern.
* **Skip or rhythmic counting -** Students should be given opportunities to hear and say number sequences with lots of body movements to assist, such as claps, finger clicks and slaps etc.
* Using Arrays
* **Array Flash Cards -** Create flash cards of various arrays to represent multiplication facts. In the same way that we use dice patterns as flash cards, show students different arrays, very quickly.

Then ask how many dots did you see?Allow students time to give various answers, as they answer students need to say how many rows and how many dots in each row.Show the card again and discuss the answer.Repeat* Pose this problem. Say to the students, *under this cover there are 6 cards, and under each card there are 3 dots. How many dots are there altogether?*

Students discuss the following strategies that could be used to solve the problem.Linking multiplication facts with the division facts - make students aware that their knowledge of times tables is closely related to division, e.g. 6 groups of 3 = 18 and 18 divided by 6 = 3.* Skip Counting – to solve the above problem students could count by threes across the cards.

http://www.schools.nsw.edu.au/learning/7-12assessments/naplan/teachstrategies/yr2012/images/nn_numb_mudi_02_01.jpg* Working Backwards – the students are given the final answer and they need to find out how the problem was solved using multiplication or division.

http://www.schools.nsw.edu.au/learning/7-12assessments/naplan/teachstrategies/yr2012/images/nn_numb_mudi_02_02.jpg* Use arrays to solve division as well as multiplication problems, e.g. *What is 28 divided by 4?*

Use this 4 x 7 array to solve other multiplication problems.* **Solving Word Problems**
* Demonstrate how to solve a word problem using the Newman’s questions shown below as a guide. Macintosh HD:private:var:folders:y0:ffpzcf511zq9qbjpcpl2cjyc0000gv:T:TemporaryItems:nn_numb_mudi_table_05.jpg

Assessment* Students collaboratively work with a partner to solve other problems using these questions as a guide.
 |
| LEARNING SEQUENCEExtension Late S2 or Early S3 | Ask a student to suggest a number between 1 and 20 and write it on the board. Without telling the rule to the students, multiply the number by 3 then draw an arrow from the numeral and record the result at the end of the arrow. Repeat the process for other suggested numbers.E.g. 7→21, 3→9, 20→60Ask students to identify what operation was performed on the suggested numbers. Repeat the activity by having studenst select a new rule. |
| **EVALUATION & REFLECTION** |  |

* 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.