**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| --- | --- | --- | --- | --- |
| TERM:  | WEEK: 6 | STRAND: Numbers and Algebra | **SUB-STRAND:** Patterns and Algebra 2 | **WORKING MATHEMATICALLY:** MA1-3WM, MA3-2WM, MA3-3WM |
| OUTCOMES:MA3‑8NA | **Analyses and creates geometric and number patterns, constructs and completes number sentences, and locates points on the Cartesian plane**  |
| **CONTENT:**  | * **Continue and create sequences involving** [**whole numbers**](http://syllabus.bos.nsw.edu.au/glossary/mat/whole-number/?ajax)**,**[**fractions**](http://syllabus.bos.nsw.edu.au/glossary/mat/fraction/?ajax) **and** [**decimals**](http://syllabus.bos.nsw.edu.au/glossary/mat/decimal/?ajax)**; describe the rule used to create the sequence (ACMNA133)**
* \* Continue and create number patterns, with and without the use of digital technologies, using whole numbers, fractions and decimals, e.g. 1 4  , 1 8  , 1 16  , … or 1.25, 2.5, 5, …

\* Create simple geometric patterns using concrete materials, e.g.  △,△△,△△△,△△△△, … * \* Complete a table of values for a geometric pattern and describe the pattern in words, e.g.

\* Describe the number pattern in a variety of ways and record descriptions using words, e.g. 'It looks like the [multiplication](http://syllabus.bos.nsw.edu.au/glossary/mat/multiplication/?ajax) facts for four'\* Determine the rule to describe the pattern by relating the bottom number to the top number in a table, e.g. 'You multiply the number of squares by four to get the number of matches'\* Use the rule to calculate the corresponding value for a larger number, e.g. 'how many matches are needed to create 100 squares?’ |
| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Discuss the content and students’ understanding of the first week of learning. Ask students to reflect on the post-it note activity and create a plan as to future learning.
 |
| WARM UP / DRILL |  |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | * You are visiting Disney Land. On Monday you go on 10 rides, on Tuesday you go on 12 rides and on Wednesday you go on 14 rides.

a) On Friday, how many rides do you go on?b) How many rides do you go on in total over both Saturday and Sunday? |
| QUALITY TEACHING ELEMENTS | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| Deep knowledgeDeep understandingProblematic knowledgeHigher-order thinkingMetalanguageSubstantive communication | Explicit quality criteriaEngagementHigh expectationsSocial supportStudents’ self-regulationStudent direction | Background knowledgeCultural knowledgeKnowledge integrationInclusivityConnectednessNarrative |
| RESOURCES | See throughout… |

**TEACHING AND LEARNING EXPERIENCES**

|  |  |
| --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| **COMPLETING A TABLE OF VALUES**The following activities address essential learning for students which include:* reading the title of a table
* reading headings for rows and columns
* interpreting information presented in the rows and columns
* completing a table of values for a geometric pattern or a number pattern.
* Prepare a table of values, which shows a number pattern similar to the example below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * 1
 | * 2
 | * 3
 | * 4
 | * 5
 |
| * 8
 | * 16
 | * 24
 | * 32
 | * 40
 |

* 1. Discuss the information in the table with the students. Ask students what number patterns they can see. Identify the rule to describe each row, e.g. Top row: 1, 2, 3, 4, 5, 6, ... (rule is +1) Bottom row: 6, 12, 18, 24, 30, 36, ... (rule is + 6)
	2. Describe the number pattern in a variety of ways and record the descriptions in words, e.g. *It looks like the 6 times table*.
	3. Look at the relationship between the top row and the bottom row in the table.
	4. Determine a rule to describe the pattern from the table e.g. *You multiply the top number by the six to get the bottom number*.
	5. Display the table below on a classroom wall; the table should not have a title or column headings. Students look at the numbers in the first column and compare to the numbers in the second column. Students write their suggestions for a title and column headings on paper.

|  |
| --- |
| * Title \_\_\_\_\_\_\_\_
 |
| * Heading \_\_\_\_\_\_\_\_\_\_
 | * Heading \_\_\_\_\_\_\_\_\_\_
 |
| * 1
 | * 5
 |
| * 2
 | * 10
 |
| * 3
 | * 15
 |

Discuss, giving reasons to justify their suggested title and headings, e.g. number of fingers on a hand, number of sides of a pentagon.* Give students a copy of the table below. The table has the title and headings only.

|  |
| --- |
| * Hours in a Week
 |
| * Number of Days
 | * Number of Hours
 |
|  |  |
|  |  |
|  |  |

* 1. Students suggest data which could go in each column to match the column headings. Ask students for reasons to justify the data they have suggested.
	2. Pose this problem for the class to solve.
	3. *How many numbers are in the following number pattern?*  *The first 4 numbers and the last number have been given.* 8, 16, 24, 32, ...,144
	4. Discuss the strategies the students used. Ask students to draw a table to demonstrate how the problem can be solved.
	5. Ask: *What is the relationship between each number and the position of the number in the pattern?*
	6. Repeat for other number patterns. Continue the pattern by adding 5 more terms. Students determine what the last number would be. 8, 16, 24, 32, ...,144, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_

<http://studyjams.scholastic.com/studyjams/jams/math/algebra/function-tables.htm>(View with the class on the interactive whiteboard and practise some questions. Discuss.**Review**Review the concepts above and provide a selection of tasks that link the ideas together.  | LEARNING SEQUENCERemediationS2 | * Fir Tree Investigation:

<http://www.mathwire.com/problemsolving/4firtree.pdf>  |
| LEARNING SEQUENCES3 | * Building Patterns 3:

<http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/assets/pdf/s4_teach_ideas/algebra/pattern_3.pdf>  |
| LEARNING SEQUENCEExtension Early S4 | * Hexagon Dragons

<http://mathwire.com/problemsolving/4hexagondragons.pdf>* Tables and Chairs Investigation

<http://mathwire.com/algebra/tableschairs.pdf>  |
| **EVALUATION & REFLECTION** | * Review the maths learning journals and ask students how they feel about the level of complexity in their week of learning. Make alternations to planning based on the general responses.
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