**PATTERNS AND ALGEBRA 1 – STAGE 3**

**OUTCOMES**

A student:

* 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
* MA3-8NA - analyses and creates geometric and number patterns, constructs and completes number sentences, and locates points on the Cartesian plane

|  |  |
| --- | --- |
| **CONTENT** | **plan** |
| **Describe, continue and create patterns with [fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/fraction/?ajax" \t "_blank" \o "Click for more information about 'fractions'), [decimals](http://syllabus.bos.nsw.edu.au/glossary/mat/decimal/?ajax" \t "_blank" \o "Click for more information about 'decimals') and [whole numbers](http://syllabus.bos.nsw.edu.au/glossary/mat/whole-number/?ajax" \t "_blank" \o "Click for more information about 'whole numbers') resulting from addition and subtraction (ACMNA107)** | 1 |
| identify, continue and create simple number patterns involving addition and subtraction CT | 1 |
| describe patterns using the terms 'increase' and 'decrease', eg for the pattern 48, 41, 34, 27, …, 'The terms decrease by seven' http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 1 |
| create, with materials or digital technologies, a variety of patterns using whole numbers, fractions or decimals | 1 |
| use a [number line](http://syllabus.bos.nsw.edu.au/glossary/mat/number-line/?ajax" \t "_blank" \o "Click for more information about 'number line') or other diagram to create patterns involving fractions or decimals | 1 |
|  |  |
| **Use equivalent number sentences involving [multiplication](http://syllabus.bos.nsw.edu.au/glossary/mat/multiplication/?ajax" \t "_blank" \o "Click for more information about 'multiplication') and division to find unknown quantities (ACMNA121)** |  |
| complete number sentences that involve more than one [operation](http://syllabus.bos.nsw.edu.au/glossary/mat/operation/?ajax" \t "_blank" \o "Click for more information about 'operation') by calculating missing numbers | 2 |
| describe strategies for completing simple number sentences and justify solutions (Communicating, Reasoning)CT | 2 |
| identify and use inverse operations to assist with the solution of number sentences | 2 |
| describe how inverse operations can be used to solve a number sentence (Communicating, Reasoning) CT | 3 |
| complete number sentences involving multiplication and division, including those involving simple fractions or decimals | 3 |
| check solutions to number sentences by substituting the solution into the original question (Reasoning) CT | 4 |
| write number sentences to match word problems that require finding a missing number, eg 'I am thinking of a number that when I double it and add 5, the answer is 13. What is the number?' http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 4 |

**PATTERNS AND ALGEBRA 2 – STAGE 3**

**OUTCOMES**

#### A student:

* 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
* MA3-8NA - analyses and creates geometric and number patterns, constructs and completes number sentences, and locates points on the Cartesian plane

|  |  |
| --- | --- |
| **CONTENT** | **plan** |
| **Continue and create sequences involving [whole numbers](http://syllabus.bos.nsw.edu.au/glossary/mat/whole-number/?ajax" \t "_blank" \o "Click for more information about 'whole numbers'), [fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/fraction/?ajax" \t "_blank" \o "Click for more information about 'fractions') and [decimals](http://syllabus.bos.nsw.edu.au/glossary/mat/decimal/?ajax" \t "_blank" \o "Click for more information about 'decimals'); 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 | 5 and 6 |
| * describe how number patterns have been created and how they can be continued (Communicating, Problem Solving) CT | 5 |
| * create simple geometric patterns using concrete materials, eg | 6 |
| * complete a table of values for a geometric pattern and describe the pattern in words, eg CThttp://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 6 |
| * describe the number pattern in a variety of ways and record descriptions using words, eg 'It looks like the [multiplication](http://syllabus.bos.nsw.edu.au/glossary/mat/multiplication/?ajax" \t "_blank" \o "Click for more information about 'multiplication') facts for four' | 6 |
| * determine the rule to describe the pattern by relating the bottom number to the top number in a table, eg 'You multiply the number of squares by four to get the number of matches' | 6 |
| * use the rule to calculate the corresponding value for a larger number, eg 'How many matches are needed to create 100 squares?' | 6 |
| * complete a table of values for number patterns involving one [operation](http://syllabus.bos.nsw.edu.au/glossary/mat/operation/?ajax" \t "_blank" \o "Click for more information about 'operation') (including patterns that decrease) and describe the pattern in words, eg  http://syllabus.bos.nsw.edu.au/wsimages/cca/l.pngCT | 7 |
| * describe the pattern in a variety of ways and record descriptions in words, eg 'It goes up by ones, starting from four' | 7 |
| * determine a rule to describe the pattern from the table, eg 'To get the value of the term, you add three to the position in the pattern' | 7 |
| * use the rule to calculate the value of the term for a large position number, eg 'What is the 55th term of the pattern?' | 7 |
| * explain why it is useful to describe the rule for a pattern by describing the connection between the 'position in the pattern' and the 'value of the term' (Communicating, Reasoning) http://syllabus.bos.nsw.edu.au/wsimages/cca/l.pngCT |  |
| * interpret explanations written by peers and teachers that accurately describe geometric and number patterns (Communicating) http://syllabus.bos.nsw.edu.au/wsimages/cca/l.pngCT | 7 |
| * make generalisations about numbers and number relationships, eg 'If you add a number and then subtract the same number, the result is the number you started with' CT | 7 |
| **Introduce the [Cartesian coordinate system](http://syllabus.bos.nsw.edu.au/glossary/mat/cartesian-coordinate-system/?ajax" \t "_blank" \o "Click for more information about 'Cartesian coordinate system') using all four quadrants (ACMMG143)** |  |
| * recognise that the number plane (Cartesian plane) is a visual way of describing location on a grid | 8 and 9 |
| * recognise that the number plane consists of a horizontal axis (*x-*axis) and a vertical axis (*y-*axis), creating four quadrants  http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 8 and 9 |
| * recognise that the horizontal axis and the vertical axis meet at [right angles](http://syllabus.bos.nsw.edu.au/glossary/mat/right-angle/?ajax" \t "_blank" \o "Click for more information about 'right angles') (Reasoning) | 8 and 9 |
| * identify the [point](http://syllabus.bos.nsw.edu.au/glossary/mat/point/?ajax" \t "_blank" \o "Click for more information about 'point') of intersection of the two axes as the origin, having coordinates (0, 0) http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 10 and 11 |
| * plot and label points, given coordinates, in all four quadrants of the number plane http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 10 and 11 |
| * plot a sequence of coordinates to create a picture (Communicating) http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 10 and 11 |
| * identify and record the coordinates of given points in all four quadrants of the number plane | 12 |
| * recognise that the order of coordinates is important when locating points on the number plane, eg (2, 3) is a location different from (3, 2) (Communicating) | 12 |