Booragul Public School NSW Syllabus for the Australian Curriculum- Number and Algebra

Patterns and Algebra 2			
Outcome	**Teaching and Learning Activities**	**Notes/ Future Directions/Evaluation**	**Language / Date**
A student: › describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols **MA1-1WM** › uses objects, diagrams and technology to explore mathematical problems **MA1-2WM** › supports conclusions by explaining or demonstrating how answers were obtained **MA1-3WM** › creates, represents and continues a variety of patterns with numbers and objects **MA1-8NA** **Australian Curriculum Syllabus reference:** **88-89**			pattern, **missing number**, **number sentence**.
Activities			
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?			Sample Units of Work pg 61 Hundreds chart
Frog Jumps - Set of number cards are placed face down in order. Teacher turns over cards eg. 3, 6 and 9 and places the frog counter on number 9. Teacher explains that Freddie the Frog has jumped on some of the cards to make a number pattern. Ask questions. (Refer to p. 61 of Sample Units for these)			

Is It True?

Record statements such as the following, some true and some not true, and ask students if they are true, and to justify their answers. For example:

14 + 2 = 2 + 14
18 + 3 = 2 + 18
56 + 79 = 79 + 56

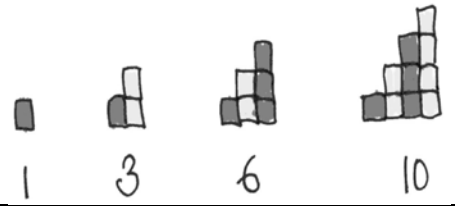
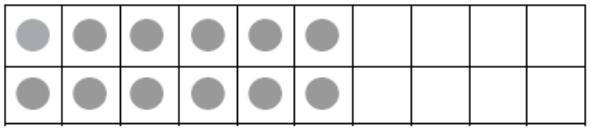
Do students realise that they do not have to do the addition in any of these examples, but they simply have to compare the two expressions?
Do they baulk at the large numbers in the third example, not realising that no calculations need to be done?
This activity gives students the opportunity to generalise about patterns of addition. The term commutative property is not used at this stage.
Students make comments such as You don't have to do the plus, you just have to see it's the same numbers backwards.

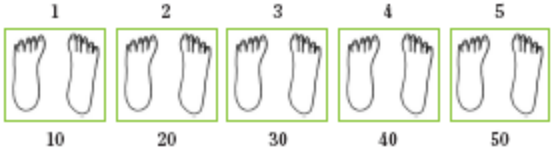
Number Relationships

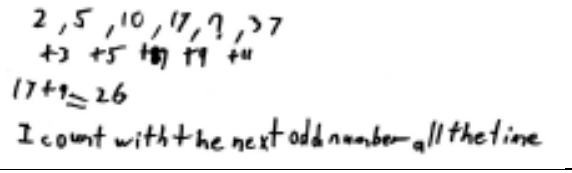
At this Stage, describing number relationships and making generalisations should be encouraged when appropriate. The concept of equality and the understanding that the equals sign also means 'is the same as' is important.

Things to consider

- Use the equals sign to record equivalent number relationships and to mean 'is the same as' rather than as an indication to perform an operation
  Eg 5 + 2 = 4 + 3
- Build addition facts to at least 20 by recognising patterns or applying the commutative property
  Eg 4 + 5 = 5 + 4
- Relate addition and subtraction facts for numbers to at least 20
  Eg 5 + 3 = 8 so 8 - 3 = 5 and 8 - 5 = 3
- Model and record patterns for individual numbers by making all possible whole number combinations
  E.g 0 + 4 = 4
  1 + 3 = 4
  2 + 2 = 4
  3 + 1 = 4
  4 + 0 = 4
- Find and make generalisations about number relationships eg adding zero does

not change the number as in 6 + 0 = 6 (additive identity) Odd + odd = even Odd + even = odd Students explain why.		
Number sequences Students investigate sequences of numbers that have arisen in their number investigations, using interlocking cubes or counters, and recording their findings. For example, they find the sequence of staircase numbers, making them with interlocking cubes, drawing them and recording the number of cubes used.  		
Exploring Odd and Even In pairs, students are given twenty counters and a 10 × 2 grid. The teacher chooses a number (in the range 1 to 20) and asks the students to collect that number of counters and place them on the grid, paired in two rows. eg 'Collect 12 counters and pair them in two rows on the grid.' Students are asked to keep a record of which numbers of counters cannot, and which numbers can, be paired. The teacher continues to choose other numbers for students to explore and uses the terms 'odd' and 'even' to describe the two groups of numbers.  Possible questions include: ▮ what do you notice about all the numbers of counters that can be paired? ▮ when the number of counters cannot be paired, what do you notice about the number of counters left over? ▮ would you be able to pair 28 counters? 31 counters? ▮ can you name other even numbers? odd numbers?		**Sample Units of Work pg 63**

Toes Counting Put out one picture of a pair of feet, ask students how many toes there are and record the number 10. Add another pair of feet, count the toes and record the total number of toes. Continue adding pairs of feet and recording the number of toes to build the count-by-tens number sequence. Display on a wall the pictures of the feet with the number of pairs of feet recorded above the picture and the number of toes below, so that, for example, the fifth pair of feet has 5 above it and 50 below. Do students notice the relationship between each *pair of feet* number and the associated *toes number*? It is important for later algebraic generalisation that students begin to make connections between the numbers in a sequence and their position in the sequence, as demonstrated in this activity that links *feet numbers* and *toes numbers*.  		
Continuing Number Sequences Begin a number sequence and ask students to work in pairs to continue it. The following are sequences that the students have previously generated (count-by-threes, staircase numbers, doubling sequence, square numbers). 3, 6, 9, 12, 15, … 30, 27, 24, 21, 18, … 1, 3, 6, 10, 15, … 1, 4, 7, 10, 13, … 1, 2, 4, 8, 16, … 1, 3, 7, 13, 21, … 1, 4, 9, 16, 25, … 100, 90, 81, 73, 66, … Students describe the patterns and how they continued them. This will involve them in describing and labelling the patterns. This activity provides an opportunity to develop mathematical language. Support students to use appropriate language. Students set similar tasks for their peers.		
Missing Numbers		

Students work out the missing numbers in sequences such as the following. 2, 5, 8, 11, ?, 17, 20 3, 6, 12, ?, 48, 96 20, 19, 17, 14, ?, ?, 10, 20, 30, 40, 50 100, 92, 84, ?, 68, 60, 52 2, 5, 10, 17, ?, 37 They explain how they worked out the missing numbers. This will involve them in describing and labelling the patterns. This activity provides an opportunity to develop mathematical language. Support students in using appropriate language. Students find different ways of working out the same missing number. For example, the missing number in the last sequence above might be found by noting that the differences between the terms increases by two each time, or noting that the differences form the sequence of odd numbers starting from 3, or noting that each number is one more than a square number.  		
Card sequence Select 10 numeral cards and place them in a line to form a sequence, with one or more of the cards turned face down. 5 10 15 20 30 35 40 In this example, students identify that 25 and 45 are the numbers facing down, and explain how they did this.		
