LEVEL: Year 2	CONTENT: Number & Algebra	FOCUS: Pattern
In the Classroom		
PURPOSE	- Use numbers and symbols to copy and continue a pattern - Investigate number sequences - Identify rules or functions for number patterns - Use what is known about a pattern to predict missing or future terms	
WARM UP	**Play Speedo (also called Number Trails)** Introduce the Speedo game to students. Choose a starting number, say 5, and a number to count by, say 2. When teacher says start, students record the related number sequence in a column in their book, e.g. 5, 7, 9, 11, 13. After a few moments the teacher stops the students and the number sequence is recorded on the board and any patterns are discussed.	
INTRODUCTION	Brief introduction to Good Mathematicians – make a list and place on the board, include teamwork, asking questions, sharing ideas, recording ideas, explaining thinking, persistence, checking solutions and learning from mistakes.	
EXPLICIT TEACHING & LEARNING	**Investigating Patterns** Toby is trying to improve his fitness. On the first day he managed to do only 3 push ups. For the next week he managed to do 5 push ups each day. If Toby continues to do 5 push ups each day, how many days will it take him to have completed at least 50 push ups? On what day of training will Toby have completed at least 100 push ups? **Challenge** Toby's mate Johnny prefers to do sit ups. He found that with practise, each day he could do more. Here are the number of sit ups he has done each day this week. **7, 11, 15, 19, ?, 27, 31** On Friday he forgot to record his total. Using the pattern can you predict how many sit ups Johnny did? How many days will it take Johnny to be able to do 50 sit ups?	
DISCUSSION/KEY QUESTIONS	- Can you describe the pattern? - What comes next in the pattern? - How could we record this patterns in our books? - Instead of using symbols, how else could we record the patterns in our books? - Can we use a counting chart to help us identify the pattern? - What is the rule or function for this pattern? - How can we use what we know to find other numbers in the pattern?	
DELIBERATIVE PRACTICE	The focus of this activity is to discover if students can use numbers to describe a pattern that it written as a description. From here we are interested in finding out if students can interpret the pattern, discover the rule and apply this rule to find missing or future terms.	
REFLECTION	Reflect on how recording numbers in a sequence can help us analyse what is happening with the problem. From here we can look for patterns, develop a rule and predict future terms. Also reflect as a class on students who were a Good Mathematician and why – have students nominate one another. Remind students of list created at the beginning of the lesson.	
RESOURCES	Paper to record patterns Counting chart	

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Curriculum Connections	
CONTENT	**NSW Syllabus Mathematics K-10 – Stage 1.2** **Patterns & Algebra 2** Describe patterns with numbers and identify missing elements (ACMNA035) • describe a number pattern in words, e.g. 'It goes up by threes' • determine a missing number in a number pattern, e.g. 3, 7, 11, __, 19, 23, 27 • describe how the missing number in a number pattern was determined (Communicating, Reasoning) • check solutions when determining missing numbers in number patterns by repeating the process (Reasoning) Solve problems by using number sentences for addition or subtraction (ACMNA036) • complete number sentences involving one operation of addition or subtraction by calculating the missing number, e.g. find □ so that 5+□=13 or 15−□=9 • make connections between addition and related subtraction facts to at least 20 (Reasoning) • describe how a missing number in a number sentence was calculated (Communicating, Reasoning) • solve problems involving addition or subtraction by using number sentences • represent a word problem as a number sentence (Communicating, Problem Solving) • pose a word problem to represent a number sentence (Communicating, Problem Solving)
WHAT CAME BEFORE	Students will be familiar with creating and identifying repeating patterns with objects and in number sequences but may need assistance recording a pattern based on information in a text.
WHAT COMES NEXT	By recording the pattern as a number sequence, students will be able to look for patterns and hopefully identify the rule or function for the pattern. This will help students to identify number patterns in a table.
VOCABULARY	Repeating pattern, growing pattern, next, before, after, ordinal numbers, first, second, last, copy, continue, create, explain, unit of repeat, objects, rule or function of the pattern (e.g. 2, 4, 6, 8 the function is add 2 or + 2), skip counting, odd and even numbers, missing values.
MISCONCEPTIONS	Some students may make prediction about what is happening in the pattern based only on the first 2 terms in the sequence, e.g. 2, 4 the rule could be add 2 or it could be doubling, students will therefore need to predict what the rule for the pattern is, then check to see if their prediction holds.
WHAT PROFICIENCIES ARE TO BE UTILISED? **Understanding** **Fluency** **Problem Solving** **Reasoning** **Communicating (NSW)** **Justifying (NSW)**	**Year 2 (Australian Curriculum)** **Understanding** includes connecting number calculations with counting sequences, partitioning and combining numbers flexibly and identifying and describing the relationship between addition and subtraction and between multiplication and division **Fluency** includes readily counting numbers in sequences, using informal units iteratively to compare measurements, using the language of chance to describe outcomes of familiar chance events and describing and comparing time durations **Problem-solving** includes formulating problems from authentic situations, making models and using number sentences that represent problem situations, and matching transformations with their original shape **Reasoning** includes using known facts to derive strategies for unfamiliar calculations, comparing and contrasting related models of operations and creating and interpreting simple representations of data. **NSW Syllabus Mathematics K-10 – Stage 1.2 Outcomes** • describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols • uses objects, diagrams and technology to explore mathematical problems • supports conclusions by explaining or demonstrating how answers were obtained • creates, represents and continues a variety of patterns with numbers and objects
ASSESSMENT	Ask students to use numbers and symbols to record and continue the pattern in their books. Students are encouraged to record the totals in a number sequence. This will help to show what is happening with the pattern and then this information can be used to find out the rule or function for the pattern and predict missing or future terms.

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