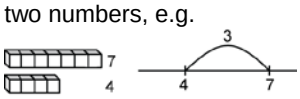
LEVEL: Year 1	CONTENT: Number & Algebra	FOCUS: Addition and Subtraction Strategies
In the Classroom		
PURPOSE	• Use materials to represent different numbers • Partition numbers to show different facts, e.g. 2 and 3 makes 5 • Explain how different numbers can be partitioned • Combine collections and identify the total • Compare the size of collections and identify the difference • Use symbols to represent known facts	
INTRODUCTION	Brief introduction to Good Mathematicians – make a list and place on the board, include teamwork, asking questions, sharing ideas, showing ideas, explaining thinking, recording ideas, persistence, checking work, learning from mistakes and believing in yourself.	
WARM UP	Tip a pile of the Cuisenaire rods onto each table. Ask the students to explore the material and to tell you what they notice Have students share and prove their thinking. For example, I think the long orange rod is 10 as I can use 10 white rods to make it.	
EXPLICIT TEACHING & LEARNING	**Show me the Number** Encourage students to choose a number, say 5 and find all the different ways to represent that number using the rods. How can they record what they have learnt using symbols? **Challenge** Can students use the rods to combine and compare collections? Can they explain their thinking? Can they begin to use symbols to show what is happening?	
DISCUSSION/KEY QUESTIONS	• What do the different rods represent? How can you prove this? • How many different ways can you show the number 5? • How can you prove that you are correct? • Can you use symbols to record these different representations? • Can you combine collections and find the total? • Can you compare collections and find the difference? • How can you use symbols to represent what you have discovered?	
DELIBERATIVE PRACTICE	Before students can combine or separate collections, it is important that students 'trust the count' and have a good understanding of the relationship between numbers. Using Cuisenaire rods requires students to trust the count. Exploring this resource can help students to represent numbers in a variety of ways and prove that their solution is correct.	
REFLECTION	Throughout the lesson encourage students to show how different numbers can be represented using the rods and explain how they know this is correct. Also make links with the rods and using symbols to record. 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	Large collection of Cuisenaire rods (also known as coloured rods) 1 cm grid paper	

Curriculum Connections	
CONTENT	**NSW Syllabus Mathematics K-10 – Stage 1** **Addition and Subtraction 1** Represent and solve simple addition and subtraction problems using a range of strategies, including counting on, partitioning and rearranging parts (ACMNA015) • use the terms 'add', 'plus', 'equals', 'is equal to', 'take away', 'minus' and the 'difference between' • use concrete materials to model addition and subtraction problems involving one- and two-digit numbers • use concrete materials and a number line to model and determine the difference between two numbers, e.g.  The difference between 7 and 4 is 3. • recognise and use the symbols for plus (+), minus (–) and equals (=) • record number sentences in a variety of ways using drawings, words, numerals and mathematical symbols • recognise, recall and record combinations of two numbers that add to 10 • create, record and recognise combinations of two numbers that add to numbers up to and including 9 • model and record patterns for individual numbers by making all possible whole-number combinations, e.g. 5+0=5; 4+1=5; 3+2=5; 2+3=5; 1+4=5; 0+5=5 (Communicating, Problem Solving) • describe combinations for numbers using words such as 'more', 'less' and 'double', e.g. describe 5 as 'one more than four', 'three combined with two', 'double two and one more' and 'one less than six' (Communicating, Problem Solving) • create, record and recognise combinations of two numbers that add to numbers from 11 up to and including 20 • use combinations for numbers up to 10 to assist with combinations for numbers beyond 10 (Problem Solving) • investigate and generalise the effect of adding zero to a number, e.g. 'Adding zero to a number does not change the number' • use concrete materials to model the commutative property for addition and apply it to aid the recall of addition facts, e.g. 4 + 5 = 5 + 4 • relate addition and subtraction facts for numbers to at least 20, e.g. 5 + 3 = 8, so 8 – 3 = 5 and 8 – 5 = 3 • use and record a range of mental strategies to solve addition and subtraction problems involving one- and two-digit numbers, including: o counting on from the larger number to find the total of two numbers o counting back from a number to find the number remaining o counting on or back to find the difference between two numbers o using doubles and near doubles, e.g.5 + 7: double 5 and add 2 o combining numbers that add to 10, e.g.4 + 7 + 8 + 6 + 3: first combine 4 and 6, and 7 and 3, then add 8 o bridging to 10, e.g.17 + 5: 17 and 3 is 20, then add 2 more o using place value to partition numbers, e.g.25 + 8: 25 is 20 + 5, so 25 + 8 is 20 + 5 + 8, which is 20 + 13 • choose and apply efficient strategies for addition and subtraction (Problem Solving) • use the equals sign to record equivalent number sentences involving addition, and to mean 'is the same as', rather than as an indication to perform an operation, e.g. 5 + 2 = 3 + 4 • check given number sentences to determine if they are true or false and explain why, e.g. 'Is 7 + 5 = 8 + 4 true? Why or why not?' (Communicating, Reasoning)
WHAT CAME BEFORE	Students will be able to use materials to represent small collections, but can students use their knowledge of numbers to interpret the Cuisenaire rods. This requires and ability to trust the count.
WHAT COMES NEXT	Cuisenaire rods are an under used resource. Once students establish what the different colours represent they can be challenged to make all different collections. A good activity is to use the rods to make 100. There is even a related twitter hashtag #hundredface
VOCABULARY	Counting, numbers, materials, Cuisenaire rods, coloured rods, number facts, addition, combine, total, sperate, rake-away, difference between, subtraction, symbols, equals, total, is the same as, makes, represents

MISCONCEPTIONS	Some students, often when prompted, will be able to recall their tens fact, but they may not be able to apply these facts in any meaningful ways. They also may not be aware of the 'facts' related to other numbers, such as 5 or 7. An ability to be able to flexibly partition numbers will help students to add and subtract larger numbers going forward.
WHAT PROFICIENCIES ARE TO BE UTILISED? **Understanding** **Fluency** **Problem Solving** **Reasoning** **Communicating (NSW)** **Justifying (NSW)**	**Year 1 (Australian Curriculum)** **Understanding** includes connecting names, numerals and quantities, and partitioning numbers in various ways **Fluency** includes readily counting number in sequences forwards and backwards, locating numbers on a line and naming the days of the week **Problem-solving** includes using materials to model authentic problems, giving and receiving directions to unfamiliar places, using familiar counting sequences to solve unfamiliar problems and discussing the reasonableness of the answer **Reasoning** includes explaining direct and indirect comparisons of length using uniform informal units, justifying representations of data and explaining patterns that have been created. **NSW Syllabus Mathematics K-10 – Stage 1 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 • uses a range of strategies and informal recording methods for addition and subtraction involving one- and two-digit numbers
ASSESSMENT	**EXIT PASS** Record as many ways as you can to represent the number 17