AMSI SCHOOLS LESSON OUTLINE

LEVEL: Year 3/4	CONTENT: Number and Algebra	FOCUS: Subtraction
In the Classroom		

PURPOSE	- Recall addition facts and related subtraction facts - Recognise the relationship between addition and subtraction - Use knowledge of addition, subtraction to solve more challenging problems - Recognise that subtraction is not commutative - Partition numbers to assist with calculations - Identify whether a strategy is efficient - Explain strategies using a written method - Recognise that written equations must balance - Check solutions using an alternative strategy
WARM-UP	**Totality** Model and play the game Totality. This is simple strategy game where the main focus is on getting students to practise their addition facts.
INTRODUCTION	**SHOW – EXPLAIN – CHECK** Introduce the Show – Explain – Check strategy to students. Make connections with literacy and encourage students to identify different methods for checking their calculations.
EXPLICIT TEACHING & LEARNING	**Solve this… 204 – 178** Write the expression on the board and ask students to solve it. Provide all students with a blank sheet of paper so it can be collected (use same sheet for the exit pass). Encourage students to find a way to check their solution. Choose students to share their strategies. Name and group these different strategies. If no student suggests it – model the count up to strategy with the whole class. Provide the whole class with another problem and get them to trial using the count up to strategy. Students may then check the solution using their preferred method.
DISCUSSION/KEY QUESTIONS	- Can you recall addition facts involving single-digit number? - What are the related subtraction facts? - Can you record the fact family related to a given number fact? - What strategies can we use to solve subtraction problems? - How can we check to see if our strategy is correct? - Why isn't subtraction commutative? i.e. why doesn't 3 – 4 = 4 – 3? - How can we partition numbers? - What is the relationship between addition and subtraction? - How can we use addition to solve subtraction problems? - Is the strategy used efficient? - How can we check our solution?
DELIBERATIVE PRACTICE	This activity is designed to encourage students to develop and explain their own strategy to solve subtraction problems and to then use an alternative strategy to check if their calculations are correct. It is also intended to expose students to the count up to strategy which allows students to use addition to solve subtraction problems.
REFLECTION	Encourage students to explain the strategy they have used and provide students with the name of this strategy if they are unsure. Focus on the importance of using a strategy that is efficient for YOU, along with the importance of using a different strategy to CHECK any calculations.
RESOURCES	Totality game board (WORD file – Totality game) and counters https://nrich.maths.org/1216

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Curriculum Connections	
CONTENT	**VICTORIAN CURRICULUM F-10 – Number & Algebra** **Year 3 – Number & Place Value** Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation(VCMNA133) **Elaborations:** recognising that certain single-digit number combinations always result in the same answer for addition and subtraction, and using this knowledge for addition and subtraction of larger numbers; extending strategies for addition and subtraction such as $14 + 8 + 6 = 14 + 6 + 8 = 28$ and $54 – 28 = 2 + 20 + 4$; combining knowledge of addition and subtraction facts and partitioning to aid computation. For example, $57 + 19 = 57 + 20 – 1$ **Year 4 – Number & Place Value** Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (VCMNA153) ==Year 4 – Money & Financial Mathematics== ==Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (VCMNA160)== **Year 4 – Pattern & Algebra** Use equivalent number sentences involving addition and subtraction to find unknown quantities (VCMNA163) **Elaborations:** writing number sentences to represent and answer questions such as: 'When a number is added to 23 the answer is the same as 57 minus 19. What is the number?'; using partitioning to find unknown quantities in number sentences ==Year 4 – Time== ==Use am and pm notation and solve simple time problems (VCMMG168)== ==**Elaborations:** calculating the time spent at school during a normal school day; calculating the time required to travel between two locations; determining arrival time given departure time==
WHAT CAME BEFORE	Students are often exposed to subtraction through problems that involve take-away or making a quantity smaller. Limited exposure to difference type problems can cause issues when students first attempt to use the algorithm where renaming is involved. Students will simply flip the values when using the vertical algorithm in an attempt to find the total. It is important to teach checking to ensure students are not making carless mistakes. It is also important to make it clear that subtraction is not commutative.
WHAT COMES NEXT	Students need to have a wide exposure to a range of whole number situations that involve subtraction. Students will be required to apply this knowledge in order to give change, calculate the duration between events and apply their whole number knowledge to problems that involve fractions and decimals. Poor habits with whole numbers will only exacerbate issues with decimals.
VOCABULARY	Subtract, take-away, minus, difference, more than, less than, how many, total, strategy, mental, written, algorithm, count back, count up to, empty number line, equations, balance, is the same as, commutativity
MISCONCEPTIONS	Students think that subtraction, like addition, is commutative, i.e.: $3 – 4 = 4 – 3$. This misconception can develop from rushing into the use of the vertical subtraction algorithm and an overuse of take-away type problems. It is important to expose students to a range of different problems, including those that involve finding the difference between quantities and real-life applications of subtraction such as giving change and calculating duration in time.
WHAT PROFICIENCIES ARE TO BE UTILISED? **Understanding** **Fluency** **Problem Solving** **Reasoning** **Communicating (NSW)** **Justifying (NSW)**	**Year 3 (Australian Curriculum)** **Understanding** includes connecting number representations with number sequences, partitioning and combining numbers flexibly, representing unit fractions, using appropriate language to communicate times, and identifying environmental symmetry **Fluency** includes recalling multiplication facts, using familiar metric units to order and compare objects, identifying and describing outcomes of chance experiments, interpreting maps and communicating positions **Problem-solving** includes formulating and modelling authentic situations involving planning methods of data collection and representation, making models of three-dimensional objects and using number properties to continue number patterns **Reasoning** includes using generalising from number properties and results of calculations, comparing angles and creating and interpreting variations in the results of data collections and data displays.

ASSESSMENT	**Exit Ticket –** Chris gave this solution. Show how he could check to see if his solution is correct.
	
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