

Number and Algebra: Number and Place Value: Number Puzzle

Australian Curriculum

This lesson plan could be used to support the teaching and learning of the following Content Descriptions from the Australian Curriculum.

Y6: Number and Algebra, Number and Place Value

Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)







Y6: Number and Algebra, Fractions and Decimals














Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)

Child-Friendly Aim: To calculate mentally with increasingly large numbers using all four operations.	Success Criteria: I can partition large numbers and add the most significant digits first. I can add or subtract the nearest multiple of ten or 100 then adjust. I can identify near doubles. I can form an equivalent calculation, e.g. to multiply by eight, double, then multiply by four.	Resources: Lesson Pack Scissors Glue 0-9 Dice: A template is provided if you do not have access to 0-9 dice.
	Key/New Words: Multiple, add, plus, subtract, minus, take away, sum, total, nearest, partition, partitioning, repeated steps, mental, strategy, adjust, nearest multiple, doubling, halving, equivalent calculation, multiply, multiplication, lots of, groups of, divide, division.	Preparation: 0-9 Dice – one per small group Number Puzzle Activity Cards - one per child Number Puzzle Top Cards - one per child Extra Challenge Activity Sheet – as required Strategy Poster Pack - as required Blank ThHTO Place Value Chart - as required

Prior Learning: It will be helpful if children have a secure understanding of place value, multiplication facts and corresponding number facts.

Learning Sequence

	Rolling for Gold: Children create and write a six-digit number then, in pairs, take turns to roll a 0-9 Dice . If the number rolled is a digit in their number, they subtract the number it represents, e.g. if they write 394 581 and roll a five, they subtract 500. First child to reach 0 wins. An alternate version of this game: After creating their six-digit number, children take turns to roll the 0-9 Dice . The number rolled can represent any place value e.g. 7 could represent 7, 70, 700, 7000, etc. This can then be subtracted from the six-digit number, e.g. 635 593 – 70 = 635 523. The person with the lowest number after five rolls wins.	
	Select Player: Revise mental strategies by talking through the information on the Lesson Presentation . Repeat with additional examples if necessary.	
	Can You Escape the Maze? Using the Lesson Presentation , the children find out which calculation's answer fits the given set criteria, e.g. the answer is even, odd or a prime number. <i>Can the children explain how they completed the calculation? Which mental calculation method did they choose? Did anybody use a different mental calculation method?</i>	

 	<p>Number Puzzle: Explain to the children that they will be completing a range of questions that will require them to perform mental calculations using the strategies demonstrated earlier in the lesson. Remind the children to check their answers once the calculations have been completed. Support can be given through the use of a Blank ThHTO Place Value Chart, allowing children to make jottings.</p> <p>Can the children solve two or three-digit problems using mental calculations? Can the children solve whole number and decimal problems using mental calculations?</p> <div style="display: flex; justify-content: space-between;"> <div>  <p>Individually, the children match the questions and answers using the Number Puzzle Activity Cards by selecting and using an appropriate mental calculation method to answer the whole two-digit number questions. Support can be given through displaying the Strategy Poster Pack around the classroom and/or on tables.</p> </div> <div>  <p>In pairs, the children share evenly the differentiated Number Puzzle Top Cards. The children select a card from their pack and complete the three-digit whole number calculation using an appropriate mental method. The person with the highest answer wins the cards. The person with the most cards at the end of the game wins.</p> </div> <div>  <p>In pairs, the children share evenly the differentiated Number Puzzle Top Cards. The children select a card from their pack and complete the whole number and decimal calculation using an appropriate mental method. The person with the highest answer wins the cards. The person with the most cards at the end of the game wins. An Extra Challenge Activity Sheet is provided as an extension activity if required.</p> </div> </div>	
	<p>Diving into Mastery: Schools using a mastery approach may prefer to use the following as an alternative activity. These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.</p> <div style="margin-top: 10px;">  <p>Children complete fluency problems which involve performing mental calculations, including with mixed operations and large numbers.</p> </div> <div style="margin-top: 10px;">  <p>Children answer reasoning problems which involve performing mental calculations, including with mixed operations and large numbers.</p> </div> <div style="margin-top: 10px;">  <p>Children use problem solving skills in order to answer an open-ended task. This involves a greater depth of thinking when performing mental calculations, including with mixed operations and large numbers.</p> </div>	
	<p>Still Puzzling? Pose the question, 'Where can you use and apply this skill?' to the children.</p>	

Exploreit

Practiseit: Let your children practise their mental skills using this fabulous [Mental Calculations Challenge Four Operations Activity Sheet](#).

Createit: Children create their own set of mental calculation posters to describe the process of each method, giving examples.