

## ADDITION STRATEGIES

### GENERAL INFORMATION

#### Background

According to the Australian Curriculum by the end of Year 3 students should be able to recall their addition facts for single-digit numbers (and related subtraction facts) and be aware of common patterns related to these facts, for example, adding 4 and 6 will always result in a solution that is a multiple of 10. It is often the case that students are familiar with some of these facts but continue to have difficulties with others. This material will look at ways to strengthen these skills.

#### Australian Curriculum Link(s):

- Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation ([ACMNA055](#))
- Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems ([ACMNA073](#))

**Year Level(s):** 3 – 5

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#### Details:

- Add three or more single-digit numbers
- Model and apply the associative property of addition to aid mental computation, e.g.  $2 + 3 + 8 = 2 + 8 + 3 = 10 + 3 = 13$
- Apply known single-digit addition and subtraction facts to mental strategies for addition and subtraction of two, three and four-digit numbers
- Discuss and compare different methods of addition and subtraction
- Select, use and record a variety of mental strategies to solve addition and subtraction problems, including word problems

## POSSIBLE ACTIVITIES

### Getting started

To begin, we need to establish which addition facts students know confidently. Too often in schools, students practice all the different ways to make ten (often called the tens facts or friends of 10). Although this is a good start, students need to be able to identify ways to make all numbers up to about 20, i.e. friends of 5 or friends of 12, etc. A good little activity to check in on this skill is the game, *Bunny Ears*:

<https://calculate.org.au/2018/09/24/bunny-ears/>

Basically, to play this game call out a number and ask students to model it with their fingers. For example, for the number 6 a student might show 5 and 1. You then ask the student to explain how they know their method is correct and then ask them to show another way, e.g. 6 is 5 and 1, 4 and 2, 3 and 3, and 6 and 0. This little game will show if students have a good understanding of how different numbers can be partitioned. This skill will then come in useful when students are required to add multiple numbers and/or add numbers of increasing size. As the numbers increase in size, use counters, blocks, etc. to model the initial number, then show all the different ways to make or partition that number.

Once we establish that students are familiar with the different ways to partition numbers, we can begin practising adding numbers. Often in schools, students will often only practice adding two numbers (1-digit + 1 digit, 2 digits + 2 digits, etc.). Again, this is a good start but the strategies for adding two numbers may differ than when we add more numbers. This lesson plan, based on a problem from NRICH, involves finding all the possible ways to add 3 dice, and is a great activity for students to practise adding three numbers.

<https://calculate.org.au/2018/10/04/add-three-dice/>

As with multiplication, it is important that students are aware that addition is commutative, as in the order that numbers are added will not change the result. This can sometimes make problems easier to solve, e.g.  $2 + 5 + 8 = 2 + 8 + 5 = 10 + 5 = 15$ .

### Questions

- What facts do you know?
- What facts are you less confident with?
- What facts do you feel you still need to practice?
- How can we partition numbers? e.g.  $7 = 2 + 5$
- How can we use partitioning to help us solve more challenging problems? e.g.  $38 + 7 = 38 + 2 + 5$
- What strategies can I use to add two numbers? 3 numbers? Numbers of different lengths?
- How do you know your solution is correct? How could you check?

### Partitioning Activities

Activities that require students to assign values to objects, then use this information to make objects of different values can really help to check whether students understand partitioning.

- The book, *One is a snail, Ten is a crab*, provides a great example of this process. An online version of the book can be accessed here: <https://www.youtube.com/watch?v=zDjp7rTXtsk>
- This activity, *100 Face*, originally suggested to play with Cuisenaire rods could also be played with Lego or other coloured blocks: <https://calculate.org.au/2020/01/21/100-face-cuisenaire-rods/>

### Games

The following games may help students to practise adding more than two numbers. These activities could be modified by changing the value of the initial numbers.

- ROWCO: <https://calculate.org.au/2018/09/26/rowco/>
- Totality (NRICH): <https://nrich.maths.org/1216>
- Open Middle tasks: <https://calculate.org.au/2020/03/12/open-middle-tasks/>
- Yohaku number puzzles: <https://calculate.org.au/2020/03/12/yohaku-number-puzzles/>

### ADDITIONAL RESOURCES

Toy Theater has several engaging games related to addition.

<https://toytheater.com/category/math-games/addition/>

Math Playground also has an interactive activity called, Thinking Blocks, that may assist students to unpack, represent and solve worded addition problems.

[https://www.mathplayground.com/tb\\_addition/index.html](https://www.mathplayground.com/tb_addition/index.html)

### FURTHER INFORMATION

Australian Mathematical Sciences Institute. (2011). *The improving mathematics education in schools (TIMES) project: Addition and subtraction*. Retrieved from [http://amsi.org.au/teacher\\_modules/Addition\\_and\\_subtraction.html](http://amsi.org.au/teacher_modules/Addition_and_subtraction.html)

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Australian Curriculum and Assessment Reporting Authority. (2014). *Foundation to Year 10 curriculum: Mathematics*. Retrieved <https://www.australiancurriculum.edu.au/f-10-curriculum/mathematics/>

NSW Government Education Standards Authority. (2018). *Mathematics K-10: Rationale*. Retrieved from <https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/mathematics-k-10/rationale>

Pulley Sayre, A. & Sayre, J. (2006). *One is a snail ten is a crab: A counting by feet book*. Somerville, MA: Candlewick Press.