Booragul Public School- Number and Algebra
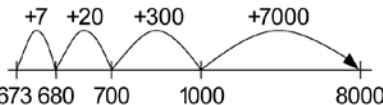
Addition and Subtraction 1

Stage 3 Outcome

A student: › describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions MA3-1WM › selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations MA3-2WM › gives a valid reason for supporting one possible solution over another MA3-3WM › selects and applies appropriate strategies for addition and subtraction with counting numbers of any size MA3-5NA	Students should be able to communicate using the following language: plus, **sum**, add, addition, **increase**, minus, the difference between, Subtract, subtraction, **decrease**, equals, is equal to, empty number line, strategy, digit, estimate, round to, **budget**.

Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date/ LAC Icons
<u>Ignition Activities</u> **Greedy Pig** 1. To play this game you need an ordinary 6-sided die. 2. Each turn of the game consists of one or more rolls of the die. You keep rolling until you decide to stop, or until you roll a 1. You may choose to stop at any time. 3. If you roll a 1, your score for that turn is 0. 4. If you choose to stop rolling before you roll a 1, your score is the sum of all the numbers you rolled on that turn. 5. Each player has 10 turns. The player with the highest score wins. There are many variations of this game, the most common being a full class version in which the teacher rolls the die, and calls out the numbers. All students play using the same numbers and their score depends on when they elect to 'save' their score. If they save their score any further rolls that turn do not count towards their score. If a 1 is rolled all players who have not saved their score get 0 for that turn and the next turn starts. The ones dice can be changed to adding tens, hundreds and thousands by writing on blank dice. 1 could be changed to any other number as the key number to avoid rolling. **The ones dice can be changed to adding tens, hundreds and thousands by writing on blank dice.**		Critical and creative thinking

Calculator Race Give students a series of addition combinations of various numbers. One group can add these numbers using pencil and paper another group could use calculators and a third group could try and solve the problems mentally. Students will come to realise that the most efficient strategy to solve addition problems varies according to the difficultly of problems.		
Explicit Mathematical Teaching Use the term 'sum' to describe the result of adding two or more numbers At this Stage, mental strategies need to be continually reinforced and used to check results obtained using formal algorithms. Students may find that their own written strategies that are based on mental strategies may be more efficient than a formal written algorithm, particularly for the case of subtraction. For example 8000 – 673 is easier to do mentally than by using either the decomposition or the equal addends methods. **Mentally:** 8000 = 7999 + 1 7999 – 673 = 7326 The answer will therefore be 7326 + 1 = 7327. This is just one way of doing this mentally: students could share possible approaches and compare them to determine the most efficient.		
Explicit Mathematical Teaching – The Jump Strategy **The jump strategy** can be used on an empty number line to count up rather than back. The answer will therefore be 7000 + 300 + 20 + 7 = 7327. Students could share possible approaches and compare them to determine the most efficient. The difference can be shifted one unit to the left on an empty number line, so that 8000 − 673 becomes 7999 − 672, which is an easier subtraction to calculate.		

672 673 7999 8000		
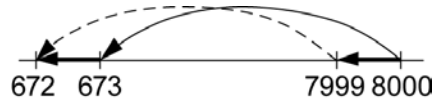
<u>Explicit Mathematical Teaching</u>

Decomposition Method:

```
  7 9 9 1
  8 0̸0̸0̸
-  673
  7327
```

Equal Addends Method:

```
    1 1 1
  8000
- 1 1 673
  7327
```

.Present a range of problems and students ask themselves "What is the best method to find a solution to this problem?

Use "Newman's Analysis" questions.

Review language for addition and subtraction.

Review each strategy. Demonstrate method of recording mental strategies and work through examples as a modelled activity.

Demonstrate using a formal written algorithm using place value - stress the setting out in columns. Add numbers with different number of digits highlighting the importance of maintaining the place value columns.

Have students estimate answers before completing addition and subtraction algorithms or afterwards to check answers.

Use rounding as a checking strategy.

Use inverse operations as a checking strategy.

Whole Class Teaching Activities-some suggestions

Totals
Use the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, and addition to make the largest possible total and the smallest possible total.
Use addition signs and subtraction signs to total 100.

Complete the Table

Numbers Between	Sum	Difference	The numbers are
50 and 100	135	5	65, 70
10 and 100	90	60	
100 and 200	205	55	
100 and 200	262	42	
500 and 1000	1 585	85	
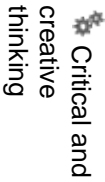
Guess and Check
Give each student two identical subtraction squares. On the first square students record their estimates of the answers, in the second square students record the answers they obtained using a calculator.

Estimate

-	2869	6431	7963	8064
1863				
2000				
2679				
196				

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Total Age
Students work out their ages in months. Total ages in small groups and then add group totals to get total age for all the class. What would be as old as our total ages?

Value for Money
Students collect supermarket brochures advertising weekly
sales. Students investigate prices (eg 4 ice-blocks for $2.95 or 6 ice-blocks for $3.95), in order to recommend the best buys.
Possible questions include:
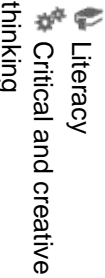▌ can you explain the best buy? Why is it the best buy?
▌ how did you work it out?
▌ is there a better strategy you could use to work it out?
Variation: Students collect a variety of brochures and rate prices according to value for money.

Open Ended Money Problems

- You are spending five nights away. You have won $500 for accommodation. Where could you stay?

Top Class Hotel	$300 per night
4 star Hotel	$225 per night
3 star Hotel	$100 per night
2 star Hotel	$60 per night
Backpackers	$25 per night

Note what methods children use to work this out i.e do they readily multiply amounts when needed or do they always add amounts? They can also of course stay at different places
- A number sentence uses three of the amounts or numbers in this rectangle

$1.50   2   50c $3

What might the number sentence be?

Guided /Independent Activities-some suggestions ***Investigations***: -How many different ways can you add 5700 + 3500 in your head? Write number sentences to explain your methods.		Critical and creative thinking
Holidays With $2 000 to spend at the holiday resort, John and Jane have many choices. Study the pricelist and plan how you and a friend would like to spend that $2 000 in 5 days. Air tickets and accommodation are already paid. Record in a spread sheet. Hire car per day $80.50 Lunches $13.00 each Dinners $38.00 each Snorkelling lessons $14.00 hr Surfing lessons $19.00 hr Magazines $ 5.95 each Theme Park visit $ 31.00 each Movies $12.00 each		Literacy Critical and creative thinking
My New Homes I have won $5 000 000 in the Lotto. I wish to purchase a number of homes as an investment portfolio. Using copies of real estate advertisements find homes to purchase that total as close to $4 000 000 as possible. Calculate the change from $4 000 000. Students are then to create a simple spreadsheet to spend their lotto win being able to give reasons for selecting, prioritising and deleting items when creating a budget.		Literacy Critical and creative thinking Information and communication tech
In the Garden I have $1 000 and wish to purchase plants for my garden. Azaleas cost $7.50, roses cost $25.00 and shrubs cost $30.00. How many of each can I buy? Is there only one alternative?		Literacy
Strategies Prepare a presentation on all the different ways you could solve these algorithms: 300 - 143, 5749 - 3490, etc Discuss.		Literacy Critical and creative thinking

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Class Investigation

<u>Scenario:</u> The school has won $1 000 000 and is thinking of putting in a games arcade for years 5 & 6 to use. The students need to come up with a proposal, purchase plan and budget to present to the school council. The final decision made will be based on the strategies the students have used and a judgement made on their efficiency. An estimate to the nearest 100 will need to be presented first. (Students do not complete until after the explicit teaching component).

Students prepare a presentation:
- Record data in a spread sheet format.
- Give reasons for selecting, prioritising and deleting in the planning process

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Literacy
Critical and creative thinking
Information and communication technology capability

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Counting On Activites

Ten-frames (p. 35 Counting On) develop concepts of addition and provide the opportunity to revisit mental computation
Empty number line (p. 57 Counting On) activities to revise strategies for mental computation

Hundreds Chart (p. 69 Counting On) activities to revise strategies for mental computation

Investigations:
- use digits 1 to 9 to make 5 addition and 5 subtraction problems. Ask your partner to solve your tasks.
- 3   ☐7 + ☐9 = ☐2☐How many
- use any four of the digits 3, 4, 5, 6 and 7 to make this number sentence: ☐☐+☐
☐
- use digits 1 to 9 once only to find solutions to this task: ☐ ☐☐
               ☐ ☐☐
               ☐ ☐☐
-how many solutions can you find?
         ☐ ☐☐
         ☐ ☐☐
         ☐☐☐
         9 9 9

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Planned Assessment **Pre Assessment** Demonstrate a range of strategies to solve a particular addition and subtraction problem e.g. jump, split, compensation, bridging. **In the Garden** I have $1 000 and wish to purchase plants for my garden. Azaleas cost $7.50, roses cost $25.00 and shrubs cost $30.00. How many of each can I buy? Is there only one alternative? Explain your answer.		
Using Technology To Teach Mathematics **Learning Object** **Wishball Challenge ; Whole Numbers** **TaLe reference Number : L871** The Wishball series of learning objects encourages thinking about place value. It also provides opportunities for mental addition and subtraction. Students work with whole numbers up to thousands. 		Information and communication technology capability