Tighes Hill Public School NSW Syllabus for the Australian Curriculum – Number and Algebra

Addition and Subtraction - 1

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<td>A student:</td>
<td>› describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols <strong>MA1-1WM</strong>&lt;br&gt;› uses objects, diagrams and technology to explore mathematical problems <strong>MA1-2WM</strong>&lt;br&gt;› supports conclusions by explaining or demonstrating how answers were obtained <strong>MA1-3WM</strong>&lt;br&gt;› applies place value, informally, to count, order, read and represent two- and three-digit numbers <strong>MA1-4NA</strong></td>
<td><strong>Background Information</strong>&lt;br&gt;By developing a variety of counting strategies and ways to combine quantities, students recognise that there are more efficient ways to count collections than counting by ones.</td>
<td>• counting on,&lt;br&gt;• counting back,&lt;br&gt;• combine,&lt;br&gt;• plus,&lt;br&gt;• add,&lt;br&gt;• take away,&lt;br&gt;• minus,&lt;br&gt;• the difference between,&lt;br&gt;• total,&lt;br&gt;• more than,&lt;br&gt;• less than,&lt;br&gt;• double,&lt;br&gt;• equals, is equal to,&lt;br&gt;• is the same as,&lt;br&gt;• number sentence,&lt;br&gt;• strategy.</td>
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Syllabus reference:
Hard copy page: 67 - 68
Digital: 72-73
## Explicit Mathematical Teaching

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, eg

- 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, eg (Communicating, Problem Solving)

| 3 + 0 = 3 |
| 4 + 1 = 5 |
| 3 + 2 = 5 |
| 2 + 3 = 5 |
| 1 + 4 = 5 |
| 0 + 5 = 5 |

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- describe combinations for numbers using words such as 'more', 'less' and 'double', eg 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, eg '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, eg 4 + 5 = 5 + 4

relate addition and subtraction facts for numbers to at least 20, eg 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:
- counting on from the larger number to find the total of two numbers
- counting back from a number to find the number remaining
- counting on or back to find the difference between two numbers
- using doubles and near doubles, eg 5 + 7: double 5 and add 2
- combining numbers that add to 10, eg 4 + 7 + 8 + 6 + 3: first combine 4 and 6, and 7 and 3, then add 8
- bridging to 10, eg 17 + 5: 17 and 3 is 20, then add 2 more
- using place value to partition numbers, eg 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, eg 5 + 2 = 3 + 4
Check given number sentences to determine if they are true or false and explain why,
egg 'Is 7 + 5 = 8 + 4 true? Why or why not?' (Communicating, Reasoning)

## Ignition/Whole class and small group

### Activities

**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.
6. 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 ten sort hundreds by writing on blank dice. 1 could be changed to any other number as the key number to avoid rolling.

**Adding Counters – See sample units of work page 43 - 45**

Students are given five counters and a work mat marked with two large circles.

Students are asked to place some of the counters in one circle and some in the other.
Possible questions include:

- how many counters did you put into each circle?
- how many counters are there altogether?

As students give their answers, the teacher models recording this as a number sentence. Students are asked to make as many different combinations to 5 as they can.

The activity is repeated using a different number of counters eg 10, 20. Students practise recording number sentences

**Toss and Add - See sample units of work page 43**

Students toss three standard dice and race to see who can state the total number of dots first.

Students are asked to share and explain their strategies.

*eg*

For this example, student strategies could include:

- counting all of the dots
- starting with the highest number and counting on the other dice one-by-one ie 4, 5, 6, 7
- starting with the known sum of two dice and counting on the third eg ‘4+1=5 and 2 more.’
- using visual imagery eg ‘I took the one dot and pretended it jumped onto the ‘four’ dice to make 5 dots, and then I added 2 more.’

Possible questions include:

- can you find a quicker way to add?
- can you add five more?
- how many do you have altogether?
- how did you get your answer?

*Variation:* Students could repeat the activity using numbered dice or dice with larger numbers.

**Blocks on the Bowl - See sample units of work page 43**

In pairs, students are given a collection of cubes (up to 10) and a bowl. The bowl is turned upside down on the desk.

Student A places the blocks on top of the bowl and Student B counts the blocks.

While Student B looks away, Student A removes some of the blocks and places them under the bowl. Student A asks
Student B ‘How many blocks are under the bowl?’
Student B records their answer. They check the actual number of blocks altogether.
Students swap roles and repeat the activity using a different number of blocks.
**Extension**: When the students are confident with combinations up to 10, the activity could be extended to include numbers greater than 10.
Possible questions include:
- how many are left?
- what does ten take away five equal?
- I am thinking of a question where the answer is 5. What could the question be?
- how many altogether?
- six plus what equals nine? (Adapted from CMIT)

### Make Your Calculator Count - from sample units of work page 43 - 45
Students are shown how to use the process of repeatedly adding the same number on a calculator to count.
*eg*
In pairs, students use the calculator to count from one by repeatedly pressing the ‘=’ button and record the counting numbers on a paper strip.
This process can be repeated by constantly adding other numbers.

### Counting-on Cards - from sample units of work page 43 - 45
**Part A**
The teacher prepares a set of number cards (a selection of numbers ranging from 20 to 50) and a set of dot cards (1 to 10). Each set is shuffled and placed face down in separate piles.
In small groups, one student turns over the top card in each pile.
*eg*
Students add the numbers represented on the cards together, and state the answer. The first student to give the correct answer turns over the next two cards.

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Variation: Students are asked to subtract the number on the
dot card from the number on the number card.

Part B
Students discuss the strategies used in Part A. The teacher
models recording strategies on an empty number line

\[
\begin{array}{cccccc}
46 & 47 & 48 & 49 & 50 & 51 \\
\end{array}
\]

Students are given the cards from Part A and are asked to turn
over the top card in each pile and record their strategies using
their own empty number line. Students share their strategies.

Doubles Bingo - from sample units of work page 43 - 45
Students are given a blank 2 × 3 grid and six counters.
Students are asked to record a number in each square that is
‘double any number’ on a standard die

\[
\begin{array}{ccc}
12 & 2 & 8 \\
6 & 2 & 6 \\
\end{array}
\]

The teacher rolls the die and states the number shown.
Students ‘double the number’ on the die and place a counter
on the corresponding answer on their grid.
The teacher continues to roll the die until one student has
covered all numbers on their grid.

Variation: Students are asked to record numbers in each
square that are ‘double plus one’ or ‘double take away one’. A
die marked with numbers other than 1 to 6 could be used.

Teddy Bear Take-away - from sample units of work page 43 - 45
In pairs, students each count out 20 teddy bear counters and
line them up in two rows of 10.
In turn, students roll a die and take away the corresponding
number of bears from their collection. Students should be
Students use their own methods to record the process.

**Make 100 - from sample units of work page 43 - 45**
The teacher removes the picture cards (Kings, Queens, Jacks) from a standard pack of playing cards. The Ace is used to represent one.
In small groups, each student is dealt six cards.
The aim of the activity is to add all six card numbers together to make the closest total to 100 (but no greater than 100).
Each student can nominate one of their cards to be a ‘tens’ card.
For example, if the student was dealt they could nominate the 7 card to have the value 70 and add the remaining cards for a total of 93.
Students could use a calculator to assist. They should be encouraged to record their calculations.

**Add or Take away - from sample units of work page 43 - 45**
The teacher removes the picture cards (Kings, Queens, Jacks) from a standard pack of playing cards. The Ace is used to represent one.
In small groups, each student is dealt four cards. The top card of the pack is then turned over to become the ‘target card’.
Students attempt to make an addition or subtraction number sentence, using any of their four cards, so that the answer equals the number shown on the ‘target card’. Students who can do this collect a counter.
The cards are returned to the pack, shuffled and the activity is repeated. Play continues until one student has collected ten counters.

**Take away popsticks - from sample units of work page 43 - 45**
In pairs, each student counts a particular number of popsticks up to 100, into a paper bag, in bundles of tens and ones.
In turn, students roll two standard dice and add together the two numbers obtained. They take that number of popsticks out of the bag and count how many are left.
Students record the activity using an empty number line.

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Variation: Students could throw the dice and use the numbers obtained to represent a two-digit number (e.g., a 3 and a 2 could be 32 or 23) to be added.

**Two Bags of Popsticks - from sample units of work page 43 - 45**

Students are given two paper bags, each containing more than ten popsticks. Students count the number of popsticks in each bag and record the amount on the bag. Some students may choose to bundle 10 popsticks together using an elastic band. Students are asked to determine the total number of popsticks in both bags. They record, share and discuss the strategies they used to calculate the total. A variety of strategies is possible.

Variation: The activity could be repeated, varying the number of popsticks to suit student performance on the task. Different materials, such as interlocking cubes, could be used.

Possible questions include:

- How can you make 37 with popsticks?
- What other strategy could be used to combine the two numbers?

Students compare recording methods with a partner and determine the quickest strategy.