

# Booragul Public School NSW Syllabus for the Australian Curriculum – Number and Algebra

<b>Whole number 2</b>			
Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Language / Date
<p><b>A student:</b></p> <ul style="list-style-type: none"> <li>› describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols <b>MA1-1WM</b></li> <li>› uses objects, diagrams and technology to explore mathematical problems <b>MA1-2WM</b></li> <li>› supports conclusions by explaining or demonstrating how answers were obtained <b>MA1-3WM</b></li> <li>› applies place value, informally, to count, order, read and represent two- and three-digit numbers <b>MA1-4NA</b></li> </ul> <p><b>Syllabus Content Note: See pages below for details</b></p> <ul style="list-style-type: none"> <li>• Develop confidence with number sequences from 100 by ones from any starting point</li> <li>• Recognise, model, represent and order numbers to at least 1000</li> <li>• Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and tens from any starting point, then moving to other sequences</li> </ul> <p><b>Syllabus reference:</b>                      Hardcopy page: 70 - 71                      Digital: 75 - 76</p>		<p><b>Background information</b></p> <p>The learning needs of students are to be considered when determining the appropriate range of two- and three-digit numbers.</p> <p>Students should be encouraged to develop different counting strategies, eg if they are counting a large number of items, they can count out groups of ten and then count the groups.</p> <p>They need to learn correct rounding of numbers based on the convention of rounding up if the last digit is 5 or more and rounding down if the last digit is 4 or less.</p> <p>The word 'and' is used when reading a number or writing it in words, eg five hundred and sixtythree.</p>	<ul style="list-style-type: none"> <li>• count forwards,</li> <li>count backwards,</li> <li>• number before,</li> <li>• number after,</li> <li>• more than,</li> <li>• less than,</li> <li>• number line,</li> <li>• number chart,</li> <li>• digit,</li> <li>• zero,</li> <li>• ones,</li> <li>• groups of ten,</li> <li>• tens,</li> <li>• groups of one hundred ,</li> <li>• hundreds ,</li> <li>• round to.</li> </ul>

Activities		
<p><b>Explicit Mathematical Teaching</b></p> <p>It is appropriate for students at this Stage to use concrete materials to model and solve problems, for exploration and for concept building. Concrete materials may also help in explanations of how solutions were arrived at. Addition and Subtraction should move from counting and combining perceptual objects, to using numbers as replacements for completed counts with mental strategies, to recordings that support mental strategies (such as jump or split, partitioning or compensation).</p> <p>At this Stage, students develop a range of strategies to aid quick recall of number facts and to solve addition and subtraction problems. Students should be encouraged to explain their strategies and invent ways of recording their actions. It is also important to discuss the merits of various strategies in terms of practicality and efficiency.</p> <p>In performing a subtraction, students could use ‘counting on or back’ from one number to find the difference. The ‘counting on or back’ type of subtraction is more difficult for students to grasp. Nevertheless, it is important to encourage students to use the ‘counting on’ strategy as a method of solving comparison problems after they are confident with the ‘take away’ type.</p>		
<p><b>Explicit Mathematical Teaching</b></p> <p><i>Students should recognise that using strategies other than counting by ones is more efficient. Regularly counting by 2’s, 5’s and 10’s forwards and backwards will familiarise students with using strategies other than counting by ones.</i></p> <p><i>Students should be able to count forwards and backwards and have an understanding of the way numerals are sequenced. Students need to understand the concept of ‘before’ being the numeral in front and ‘after’ being the next numeral. The numbers in front are worth less and the numbers after are worth more.</i></p> <p>Students should be given frequent opportunities to count forwards and backwards from various starting points.</p> <p>Counting experiences could include:</p> <ul style="list-style-type: none"> <li>• Rhythmic Counting.</li> <li>• Environmental counting.</li> <li>• Using hundreds charts count to 100 by 2’s, 5’s and 10’s starting at one and/or starting at another number other than one.</li> <li>• Circle counting. Eg. Buzz Off.</li> <li>• Counting strategies where children locate and identify errors in counting. Eg. Mr. Mistake.</li> <li>• Using body parts, count by fives and tens. Eg Flashing.</li> </ul> <p><i>Questioning</i></p> <p>Can you see/hear a pattern?</p> <p>What will be the next number in the pattern?</p> <p>What numbers reoccur in the pattern?</p> <p>At the beginning of each lesson students will need to practise;</p> <ul style="list-style-type: none"> <li>• Whole class counting forwards and backwards starting from differing numbers.</li> <li>• Before and after numbers..</li> </ul>		

<ul style="list-style-type: none"> <li>• Patterns visible on the 100 chart.</li> <li>• Skip counting by 5s and 2s from 0 and multiples of 5 and 2.</li> <li>• Counting forwards on the decade.</li> <li>• Counting forwards off the decade.</li> </ul>		
<p><b><u>EXPLICIT MATHEMATICAL TEACHING</u></b></p> <p>When teaching students to read, order and represent numbers they need to have deep understanding of the following;</p> <ul style="list-style-type: none"> <li>• Number value is read from left to right and said accordingly except for teen numbers.</li> <li>• The number eg 12 represents a collection of objects-the final number said is the number of objects altogether.</li> <li>• Place value-eg, the 3 in 132 represents 30 or 3 tens.</li> <li>• The language used when applied to numbers- such as highest, lowest, backwards and forwards</li> <li>• Place value and grouping ones by tens.</li> </ul> <p>At the beginning of each lesson students will need to practise;</p> <ul style="list-style-type: none"> <li>• Whole class counting forwards and backwards starting from differing numbers.</li> <li>• Before and after numbers.</li> <li>• Ordering two-digit and three-digit numbers from highest to lowest and vice-versa.</li> <li>• Patterns visible on the 100 chart.</li> </ul>		
<p><b><u>Ignition Activities</u></b></p> <p><b>Let's Count</b>  <b>W.A.L.T... * count forward and backwards by ... from ...</b></p> <p>The purpose of this activity is to get children counting from different numbers. Choose a child to come out the front and be the drummer. Select a number for the students to start counting from (forwards or backwards). When the drummer hits the drum the children must stop and the drummer then chooses someone who was participating to be the next drummer. Repeat the process focusing on needed areas, eg forwards counting, backwards counting 2s, 5s, off the decade etc.</p>		
<p><b>Buzz</b>  <b>W.A.L.T... *count forward and backwards by ... from ...</b></p> <p>Students stand in a circle. Select a number to count forwards or backwards by. When a designated number is reached (forwards) or zero (backwards) is said the next child is "buzz" and has to sit down. Last child standing is the winner. This game can be played with skip counting as well.</p>		
<p><b>King of the Circle – Number After</b>  Ask the student to sit in a circle.  Select one student to stand behind a second student in the circle.</p>		

<p>Roll two large dice in the middle of the circle.          Ask the two students to call out the number that comes after the number rolled.          The first student to call out the number successfully moves on to stand behind the next student in the circle.          Repeat the activity for all students.</p>		
<p><b>One More/One Less – 10 more 10 less 100 more 100 less</b>          Roll both dice and ask what is one less than?          How do you know?          Have the children sit in a circle and pass the dice around to familiarize themselves with the numbers shown. One child should roll both dice and say the number on Dice A. The next child should say the number that is one less or more as indicated by Dice B. Encourage children to respond quickly.  <i>Questioning</i>          What patterns do you use to find the numbers before or after?          What is the next number?          Which number is smallest/largest?          What number is worth more?          What number would come between these two numbers?          If I put 36 here on the number line where would I put 24?</p>		
<p><b>Greedy Pig</b></p> <ol style="list-style-type: none"> <li>1. To play this game you need an ordinary 6-sided die.</li> <li>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.</li> <li>3. If you roll a 1, your score for that turn is 0.</li> <li>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.</li> <li>5. Each player has 10 turns.</li> <li>6. The player with the highest score wins.</li> </ol> <p>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 or hundreds by writing on blank dice. 1 could be changed to any other number as the key number to avoid rolling.</p>		
<p><b>Race to and From 100</b>          In pairs, students roll a die and collect that number of popsticks. These are placed on a place value board in the 'Ones' column.          Eg</p>		

Hundreds	Tens	Ones

The student continues to roll the die, collect popsticks and place them in the Ones column. The total number of popsticks in the 'Ones' column is checked and bundled into groups of ten, when ten or more popsticks have been counted. The bundles of ten are then placed in the 'Tens' column. When there are ten tens, they are bundled to make one hundred and the game is finished. After the idea of trading is established, students could record the total number of popsticks on the place value board after each roll. Variation: Students start with 100 popsticks in the 'Hundreds' column. As the die is rolled, the number of popsticks is removed from the place value board by decomposing groups of ten. The game is finished when the student reaches zero.

**Guided and Independent Activities-some suggestions**

**Please use Best Start Early Learning Plan in conjunction with Developing Efficient Numeracy Strategies Book and Sample Units of Work book for more ideas for planning for the groups in your class**

**One More/One Less**

Roll both dice and ask what is one less than?

How do you know?

Have the children sit in a circle and pass the dice around to familiarize themselves with the numbers shown. One child should roll both dice and say the number on Dice A. The next child should say the number that is one less or more as indicated by Dice B. Encourage children to respond quickly.

*Questioning*

What patterns do you use to find the numbers before or after?

What is the next number?

Which number is smallest/largest?

What number is worth more?

What number would come between these two numbers?

If I put 36 here on the number line where would I put 24?

**Whole Class Teaching**

**Numeral Expanders**

Lead a class bases discussion about place value. Explore making a variety of 2 numbers using bundles of 10 popsticks and single pop sticks. Explore what happens when you get 10 bundles of 10 and then make a variety of 3 digit numbers. Transfer the numerals into the correct location on a numeral expander. Give

students the opportunity to use numeral expander to represent two and three digit numbers.

#### **Arrow Cards**

##### **W.A.L.T identify and order whole numbers**

##### **Activity**

Give the students sets of arrow cards. Choose the numbers that are appropriate to the students' stages. Ask them to make numbers by overlapping the arrow cards. Note the importance of lining up the points of the cards. For example, for "67" the students combine the 60 card and the 7 card. Record  $60 + 7 = 67$  on the board or modelling book.

Repeat with numbers that have zeros as place-holders. For example, 304, 470, 4 080, 4.06, 0.309.

##### **Activity**

Play a game of "Arrow Card Order". Spread the whole number arrow cards on the floor, numbers face down. You may decide to use all of the cards or limit the size of the numbers by removing some cards.

The students take turns to pick up a card of each size to form a number. They make the number and display it for the other players to see. The players decide who has the largest number, and that player gets a point. They then remove the highest place-value card eg the thousands card. Players then compare their

numbers to see who has the largest number, and that player gets a point. Players then remove the highest place-value cards again and compare their new numbers.

Repeat the game with various numbers. Vary the game so the target is the lowest number.

#### **Trading game**

Supply students with a collection of base ten material. The students take turns to throw a die and take a corresponding number of base ten "shorts" from a central pile. On succeeding throws of the die, students add appropriate numbers of "shorts" to their collection. As the students collect ten "shorts" they swap or trade them for one base ten "long". Continue the activity until one, or all students, can trade ten "longs" for a base ten "flat".

#### **Place Value Houses**

##### **T.W.W.L.T... \*make two-digit/three digit numbers.**

Using white-board textas, and the *House of Hundreds, Tens and Ones* resource (attached) tell students a number. Students write the number and then use MAB blocks to model that number.

#### **Bead Strings**

W.A.L.T order whole numbers

##### **Activity**

Show the students a bead string. Use bag tags to label the beginning and end of the string as 0 and 100.

Ask the students to use grouping strategies to locate the multiples of 10, beginning with 50 (half way), 10, and 90. Tag these numbers on the string. Now record other numbers in the range 0–100 on tags, and ask the students to find efficient ways to locate the numbers. Encourage grouping strategies. For example, 75 is found by identifying the position half way between 50 and 100.

As an independent activity, give the students bead strings and a set of tags with numbers already on them. The students place each tag in its correct position on the string. Partners check each others'

strings.

Repeat with several bead strings joined together to form a line extending into other multiples of 100. For example, five bead strings allow numbers from 0 to 500.

### **Number sort**

To play this game you will need cards with a variety of 2 and 3 digit numbers written on them. Give 5 students a numeral card and ask them to stand out the front. Teacher leads the class through the process of getting the cards in ascending order. Discuss with students that the cards are not consecutive but we are still able to put them in ascending order. Repeat with a variety of cards.

#### *Variation*

Give each student in the class a numeral card and ask the students to get in ascending order across the front of the classroom.

### **Fan Numbers**

**T.W.W.L.T... \* make two-digit/three digit number.**

Direct the children with the following commands:

Show me 4

Show me 24, 48, 134, 589 etc

#### *Variation:*

Show me the number that comes after/before 6, 17, 42 etc

### **Number Bingo**

**T.W.W.L.T... \*read two-digit/three digit numbers.**

Children fill in empty boxes with 2/3 digit numbers on a 3x3 chart. Teacher calls out "a number with an 8 in the tens place". Students who have that number circles it. Teacher keeps a record of numbers called out. First to get all numbers circled calls 'Bingo' and names their number

### **Money Matters**

#### **Part A**

Students are given a collection of coins. They demonstrate different ways to make 10c, 20c and 50c (and then \$1 and 2) using the coins. Students record their findings.

Possible questions include:

- how many different ways can you represent 50c?
- what counting strategy did you use to determine the amount of money you had?



### Part B

The teacher creates shopping situations where one student is given an amount of money to spend. They purchase a list of items. The shopkeeper totals the items and calculates the change. Students discuss strategies used to determine the cost of the list of items and the change to be given.

### Reading and Recording Cents

Students use coins to write two-digit amounts in cents.

1. Display a picture of three 10c coins on the board. *Ask: What is the value of each coin? What is the total amount that I have drawn? How do you know?* Encourage the students to explain that the number on the coin gives the value and use strategies such as counting by tens Or saying 'three tens is thirty' to work out the total value. Write 30 cents under the picture.

Repeat the discussion for five 10c coins and then seven 10c coins.

2. Display two 10c coins and one 5c coin on the board. Repeat Step 1 and write the value. Add another six 10c coins and one 5c coin to the first picture. Ask 'What is the total value now? What will we write? How do you know?' Encourage the students to explain that they could add on the six extra tens (or 60c) and then add on five more cents or replace the two 5c coins with a 10c coin and add the nine 10c coins.

3. Display a 20c coin and one 10c coin. Repeat the questions from Steps 1 and 2 and relate this new picture to the picture of three 10c coins. Display a picture of two 20c coins, two 10c coins and one 5c coin. Ask the students to work out the value and relate it to another picture of coins that is worth the same.

### Trading Coins For Equivalent Values

1. Display a \$1 coin on the board and ask 'How could we show this amount with 10c (20c, 50c) coins? Invite individuals to count out the coins and bring out the fact that 100c is the same as \$1. Repeat the discussion for 20c and 50c coins. Encourage the students to describe how they could trade two 10c coins for one 20c coin and five 10c coins for a 50c coin to establish that five 20c coins and two 50c coins are the same as \$1. Draw the pictures of ten 10c, five 20c and two 50c coins that are the same as \$1



<p>2. Ask 'How many 5c coins will we get from a 10c (20c, 50c, \$1) coin? How do you know?' Discuss each example working up to the \$1 coin.</p> <p>3. Erase the board and display eight 10c coins. Ask 'Is this a dollar? How do you know?' Encourage the students to work out the number of extra 10c coins that are needed and loop the whole amount to show that it is \$1. Repeat the steps for other pictures of 20c or 5c coins without mixing the values.</p> <p><b>Investigation</b> What different combinations of notes and gold coins could you use to pay for something that costs \$15? Think</p> <ul style="list-style-type: none"> <li>• What amounts of money are there in notes?</li> <li>• What amounts of money are there in gold coins?</li> <li>• Which of these notes are unlikely to be used to buy something for \$15</li> <li>• Is there more than one way to make up \$15 using these notes and coins?</li> <li>• Is it possible to make \$15 with just notes or just coins?</li> </ul>		
<p><b><u>Guided Group/Independent Activities</u></b></p> <p><b>Beat the Clock</b> Children practise filling in missing numbers on a hundreds square. When they have had enough practise they write the numbers one to one hundred in blank hundreds squares while you time them.</p> <p><b>Empty Number Lines</b> <b>T.W.W.L.T...</b> * work out a number using the words higher and lower. Students are given an empty number line that only shows the numbers at the start and at the end of the number line. On the reverse side all numbers are shown. A friend pegs on a peg on a particular number. The student then guesses the number. Their friend can say if the number is higher or lower. Continue until they have guessed the number. Change rolls.</p> <p><b>Mystery Arrow Number</b> (students will need to be able to count off the decade to complete this activity) <b>T.W.W.L.T...</b> * work out a number arrows for ten more or less, one more or less. Students are given an almost blank 100s chart with three or four numbers left on the chart. The teacher tells students the number to play first eg, 35. The teacher then holds up an arrow. Students write the number that corresponds with the arrows direction where it belongs eg, 35 <math>\uparrow</math> =25, 35 <math>\leftarrow</math> =24, 35 <math>\downarrow</math> =45 35 <math>\rightarrow</math> =35 . When the teacher has shown a number and an arrow they ask a student for the answer. Then the process begins again at another number that was written on the chart.</p> <p><b>Rocket – Where Will It Fit?(like Climb The ladder</b> <b>W.A.L.T</b> order whole numbers and decimals.</p>		

Equipment: A piece of scrap paper. Standard 1–6 dice or dodecahedral 0–9 dice.

### Activity

Each student needs to draw a “rocket” playing board like the one shown.

The number of floors on the rocket can be increased where larger whole numbers are involved. The aim of the game is to fill every floor of the rocket with numbers in order.

If a player cannot place a number they have thrown, they miss that turn. Players take turns to roll a dice twice. From the numbers thrown, the students decide which two digit number they will use. For example, if five and three is thrown, the student could use 53 or 35.

The students then record the number on a level of the rocket where they think it best fits between 10 and 67. Once a number is written it cannot be moved.

### Before and After

Prepare “before and after” charts for each pair of students as shown in the diagram. Numerals are written down the centre column of the chart. These numerals should be within an appropriate range for the students. Students are given numeral cards to sort and place on the chart in either the “number-before” or “number-after” spaces to form number sequences.

		13		
		17		
		19		
		16		
		14		

### Cover Up on

Cover up a number (or numbers). What number is hidden? How do you know? What things do you know about this number?

### Hundreds charts

number (or numbers). What number is hidden? How do you know? What things do you know about this number?

### Group and Independent Activities

#### Money Match

The student takes the envelope of money cards and an answer sheet and then matches the three cards that represent the same amount of money (two cards with money displayed and one card with money amount)

#### Money Machines

The student takes one money amount card and writes it at the top of of a Money Machine sheet. The student writes the value of the money card in the first row. Using addition or multiplication the student finds the value of two money cards and writes that amount in the second row. The student continues filling in each row to show how much money is in the machine.

### The Lolly Shop Concentration Game

All lolly cards are placed face down to the left and money in the purse cards are placed face down to the right. Each child takes a turn to turn over a lolly card and a money in the purse card and try to match them. If they match they keep them and if they don't they turn the cards face down again. The winner is the child who gets the most matching pairs

### Handful of Money

#### Part A

Students are given a bucket of 5c coins. They take a handful of coins from the bucket and are asked to use skip counting to determine the total.

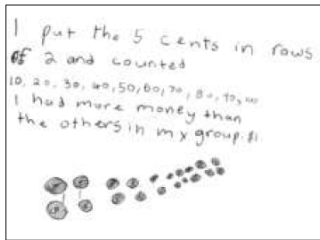
The teacher models recording the activity using repeated addition eg  $5c + 5c + 5c + 5c + 5c + 5c = 30c$ . Students are encouraged to record their actions in a similar way.

#### Part B

Students are asked to remove the coins one at a time and count backwards by fives. Students are then asked to record their actions using repeated subtraction

eg  $30c - 5c - 5c - 5c - 5c - 5c - 5c = 0$ .

*Variation:* The activity can be repeated using a bucket of 10c coins.



### Oger Counts His Money-Sheet

### How Much Do You Need? -Sheet

### Missing Money – Sheet