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

Multiplication and Division 2			
Outcome	**Teaching and Learning Activities**	**Notes/ Future Directions/Evaluation**	**Language / Date**
A student: › describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols **MA1-1WM** › uses objects, diagrams and technology to explore mathematical problems **MA1-2WM** › supports conclusions by explaining or demonstrating how answers were obtained **MA1-3WM** › uses a range of mental strategies and concrete materials for multiplication and division **MA1-6NA** **Australian Curriculum Syllabus reference:** **Pages: 79 - 80**			**add, take away,** group, **row, column, array, number of rows, number of columns, number in each row, number in each column,** total, equal, **is the same** as, shared between, **shared equally, part left over, empty number line, number chart.**

Activities **Array Race** Today We Will Learn. To… * use skip counting to add up groups and arrays. Divide class into two groups. Place students in lines. The first two students go first. Use the overhead projector to show arrays. Show easy array initially, e.g. 2 rows of five or 3 rows of 2. The first child to say the answer gets a point. An extra point is given for counting by twos or fives. Play this game a number of times during the unit. As students get better at skip counting conceal part of the array so students can count using the initial row and initial column.	
KLONK! Divide the class into 2 equal groups, Team A and Team B. Sit Students in two lines. Choose a score keeper from each team. The first two competitors are at the front of the line. Team A's competitor picks a card from the top of the pile. The scorer adds the arrays on the board as they are turned over, "2,4, 6,…" . Team A's competitor can stop and "bank" his arrays whenever he wants. This means he stops turning over cards and the team gets to keep his total. However, if he turns a Klonk card before he chooses to stop and "bank" he loses all his cards and his total is erased from the board. When Team A's competitor Klonks or Banks his cards it is then Team B's competitors turn. The process continues until everyone in each team has had a turn or the cards run out. The winning team is the team with the largest "Banked" total on the board.	
There are two forms of division: SHARING – How many in each group? eg 'If twelve marbles are shared between three students, how many does each get?' GROUPING – How many groups are there? eg 'If I have twelve marbles and each child is to get four, how many children will get marbles?' This form of division relates to repeated subtraction. After students have made equal groups (eg 3 groups of 4), the process can be reversed by sharing (eg share 12 between 3),thus linking multiplication and division. When sharing a collection of objects into two or four groups, students may describe the groups as being one-half or one quarter of the whole collection. An array is one of several different arrangements that can be used to model	

multiplicative situations involving whole numbers. An array is made by arranging a set of objects, such as counters, into columns and rows. Each column must contain the same number of objects as the other columns, and each row must contain the same number of objects as the other rows. Share learning outcomes with students at the start of each lesson *T.W.W.L.T -Today We Will Learn To…		
Follow Me Game –Doubles and halves Deal out one card for each child. First child starts off with "Who is double 12? Children all look at the top of their card and the child with the correct answer says it out loud 'I am 24' and asks the next question which is on the bottom of their card 'Who is double 8?'Game continues until all cards have been answered. Print off the cards for free at following website: http://www.primaryresources. co.uk/maths/doubles2.htm		
Linking Counting to Multiplication Students practise rhythmic counting using body percussion. For example, to count by threes students pat their knees, clap their hands, then click their fingers. They whisper as they count, stating aloud the number said on the 'click'. In small groups, students are given a supply of interlocking cubes. Each student makes a group of three cubes and places the cubes in front of them. A student is selected to 'whisper' count their group of cubes eg 'one, two, THREE'. The next student continues to count 'four, five, SIX' and this continues until all students have counted. The group joins their sets of cubes, and states the number of groups and the total number of cubes. eg '6 groups of three is 18 ' Students are then asked to form an array using the cubes. Eg The activity is repeated for other numbers.		
Rabbits' Ears **We Are Learning To… (WALT)*** *use doubles and near doubles to add numbers.* Explain/demonstrate/model Rabbits' ears for doubling. Explain/ demonstrate/model		

Rabbits' ears plus 1. Show number sentences on the board such as 4+5=___ and show students how they can use their doubling knowledge to help solve near doubles.	
Making Groups to Count In small groups, students are given a large collection of interlocking cubes. They are asked to estimate and then count the cubes. Students share their methods for counting the cubes and discuss more efficient strategies for counting. The teacher may need to suggest to the students that they connect the cubes in groups and skip count to determine the total. Possible questions include: ▌ how did you estimate the total number of cubes? ▌ how did you count the cubes? ▌ did you change your original estimate after counting to 10? ▌ can you group the cubes to help you count them quickly?	
Multiplication Monsters Draw a large double headed, three fingered, five toed, triple footed monster on the board or use the one provided. Ask the children how the monster is different to us and to work out how many eyes, fingers, toes,etc it has. Ask if two monsters arrived how we could work out the total number of eyes, fingers, etc. Draw a chart and give the children copies. Ask them to record the totals for the monsters and to look for patterns:-	

Monsters	Heads	Eyes	Hands	Fingers	Feet	Toes
1	2					
2						

Questions
What patterns can you see?
How can you use doubling to help work out the totals?

Arrays Students are briefly shown a collection of counters arranged as an array on an overhead projector.Eg		**Sample Units of Work pg 49**

Possible questions include:
▮ can you use counters to make what you saw?
▮ how many counters were there altogether?
▮ how did you work it out?
Variation: In small groups, one student is given a set of cards presenting a range of numbers arranged as arrays. The student briefly displays one card at a time for others to determine the total number of dots. **Arrays**
Students are briefly shown a collection of counters arranged as an array on an overhead projector.Eg

Possible questions include:
▮ can you use counters to make what you saw?
▮ how many counters were there altogether?
▮ how did you work it out?
Variation: In small groups, one student is given a set of cards presenting a range of numbers arranged as arrays. The student briefly displays one card at a time for others to determine the total number of dots.

Turning arrays
Provide each student with a small sheet of cardboard and a supply of counters. Instruct students to form arrays by placing the counters onto the cardboard following instructions, such as "make three rows of five counters". Students then turn the card 90degrees to show a new array of five rows of three. Discuss with the students the number of rows, the number of counters in each row and the total number of counters for each array pattern.
Variation
Allow the students to form arrays using potato prints, shape prints, thumb prints or adhesive stickers. Provide students with instruction cards for making the arrays.

Popsticks in Cups
In pairs, students place five cups on a table and put an equal number of popsticks in each cup.
Possible questions include:

Sample Units of Work pg 51

▌ how many cups are there? ▌ how many popsticks are in each cup? ▌ how many popsticks did you use altogether? How did you work it out? ▌ can you estimate the answer to the multiplication or division problem? ▌ is it reasonable? ▌ how can you check your estimation? Students share and discuss their strategies for determining the total number of popsticks eg students may use rhythmic or skip counting strategies. Students are asked to record their strategies using drawings, numerals, symbols and/or words. The teacher will need to model some methods of recording to students. *Variation:* Students are given a different number of cups and repeat the activity. (Adapted from CMIT) 		

Odd/even Numbers
Give pairs of children a pile of multilink cubes. Call out a number between 0 and 10 and ask them to make it with a tower of cubes and then try to split it into 2 equal towers. For each number you call out write it on the board and ask the children to keep a record of which numbers can/can't be split into 2 equal towers. Write up 2 column headings and ask children to come up and write up their findings.
Discuss results ☐☐
    Eight can be split into ☐☐
                  ☐☐
                  ☐☐		

Questions What do you notice about all the towers that you can split? If a number doesn't divide equally into 2, what's left over? What patterns can you find by looking at the numbers? Can you predict whether or not there will be one cube left over before you split the tower? How do you know whether a number's odd or even? How can you make an odd number into an even number? An even number into an odd number? Is the number 52 odd/even? How do you know? What about 104? 1004? Variations Roll a die. In pairs one child collects odd numbers, the other even numbers. In 10 throws who has collected the most? What about after 20 throws? **Arrays.** Provide counters to students, e.g. 16 counters. Students arrange the counters so that there are the same number in each row and each column. Students record the different ways the counters can be arranged e.g. 2 groups of 8, 8 groups of 2. Use counters on an overhead to discuss if these are the same.		
Create An Array Explain the term "array" to the students and provide them with a 10 x 10 array and two sheets of paper. Use an overhead projector or large chart to demonstrate how the 10 x 10 array can be covered with two pieces of paper to form other arrays. For example, cover the top three rows with paper and the first five columns with another piece of paper to form a 7 x 5 array (7 rows with 5 in each row). Ask the students to use their arrays sheets and paper to make nominated arrays. Have the students use skip counting of the rows to determine the answer. **Variations** Ask the students to form arrays that have a nominated number of dots, say 24. Record the arrays the students have constructed. 6 x 4, 4 x 6, 3 x 8, 8 x 3. Have the students form arrays of their own choice and describe it to other class members. Ask the students to create word problems to match the array they have constructed. For example, 4 bears live in each cave and there are 6 caves. How many bears altogether? Other students may then use their array paper to solve the problem. After the student has formed an array, ask him or her to		DENS 2 pgs 98-99

turn the array through ninety degrees and re-name the array.		
Teddy Tummies Provide pairs of students with a Teddy tummies baseboard, 30 transparent coloured counters and a worksheet displaying numerals 1– 30. Ask the students to share the counters among the teddies and mark each numeral on the worksheet with a cross as the counters are distributed. When the students are able to form equal groups on each of the teddies, (i.e. each time all teddies contain the same number of counters), have them circle the number on the worksheet instead of marking it with a cross. Have the students count the numbers from 1–30, first with a rhythmic count (saying all numbers and stressing the circled numbers) and then using a skip count (saying only the multiples 3, 6, 9 …). Provide the students with a hundred chart. Ask the students to place the counters on the hundred chart that correspond to the numerals they have circled on the worksheet. Have the students identify and discuss the number pattern for multiples of three and then continue the pattern on the hundred chart. **Variations** Change the number of teddies on the worksheet to work with multiples other than three. After the students have completed the pattern on the hundred chart, pose questions such as: Which number have you covered with your fourth counter? (12) What does this mean? Discuss the fact that this means 4 x 3 = 12. Close your eyes. What number do you think will be covered by the tenth counter? Why? (Note that the expression "covered by" is less likely to cause confusion than "under". Some students may think that 22 is "under" the fourth counter, because 22 is "under" (below) 12 on the hundred chart.		DENS 2 pgs 92-93 Teddy Tummies Baseboards pg 157 Transparent counters
Story Problems - NAPLAN PREPARATION • T.W.W.L.T… *Solve problems using pictures and skip counting. Provide students with problems and get students to draw the answers and show the total by skip counting. 1. Biraban PS was having a concert and needed 6 rows of five chairs. Draw the rows and label each with skip counting. 2. Mrs Walker brought her three dogs to school. How many dog legs are there? 3. Children in 1/2H went out in the playground and it was muddy. When they came back to the room they had to take their shoes off before going inside. There were 20 shoes outside the room. How many children were in the classroom?		

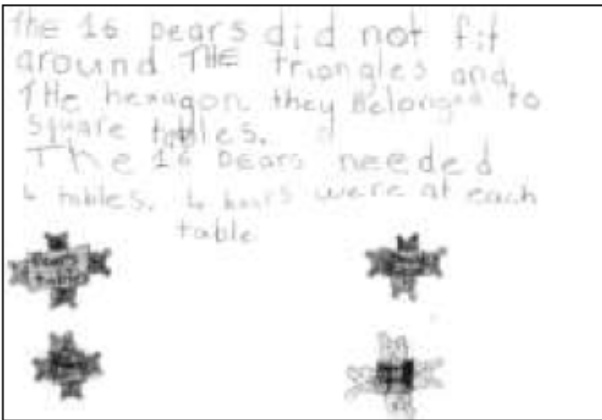|		
4.　　Mrs Parker asked 1/2CP a question. Thirty fingers were raised. How any hands went up to answer the question? •　　T.W.W.L.T… answer BST/NAPLAN questions using multiplication and division .Provide students with a copy of the BST Sample worksheet. Read through each question and allow students to answer them. Mark and discuss answers the following lesson allowing students detail how they arrived at each answer.		
Arranging Desks The teacher prepares multiple copies of the following cards. Each student is given a collection of teddy bear counters. The teacher presents the following scenario: 'There are 16 bears in a class. The teacher can choose to sit three bears at each of the triangular tables, four bears at each of the square tables or six bears at each of the hexagonal tables.' Students investigate which table shape the teacher could use so that the correct number of bears is sitting at each table. Possible questions include: ❙ which shapes did you try? ❙ can you describe what you did? ❙ how many square tables were needed? ❙ what table shape could the teacher use if there were 12 bears…21 bears…30 bears?		**Sample Units of Work pg 49**

the 16 bears did not fit around THE triangles and THE hexagon they belonged to square tables. The 16 bears needed 4 tables. 4 bears were at each table

Leftovers
Students are each given a particular number of blocks or counters. The teacher calls out a smaller number for students to make groups or rows of that number.
For example, if students are given 15 counters and are asked to make groups of 4, there would be 3 groups of 4 and 3 left over.
Students describe their actions and discuss whether it was possible to make equal groups or rows.
Students record their findings in their own way using drawings, numerals, symbols and/or words.
eg 'I made 3 groups of 4 but there were 3 left over.'
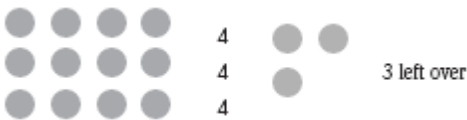
The activity is repeated for other numbers eg making groups of 5 out of the 15 blocks or counters.

Counter Grab:Multiplication
Provide students with a small container of counters and a copy of Counter Grab BLM(pg 158 of DENS 2). Instruct the students to take turns to grab a handful of counters, or other suitable material, and place them on the floor or table.

Developing Efficient Numeracy Strategies 2

Have the students firstly estimate how many counters there are and then organise the counters into groups of a nominated number, for example, groups of three. Encourage the students to determine the total by using rhythmic or skip counting, Discuss what happens when there are counters left over. On the worksheet, students record their estimate, the number of groups, the number of counters in each group, any remainders and the total. Model stress and skip counting to find the total. Variation Have the students make different equal groups from the one handful of counters and record the combinations.		*pg 96-97 Counters BLM of Counter Grab pg 158 of DENS 2*
Colour An Array Provide the students with grid paper and two dice. Tell the students that one die will represent the number of rows and the other die will represent the number of columns. Have each student roll the two dice and then colour in the corresponding number of squares on the grid paper to form an array. The student then cuts and pastes the arrays onto paper and records the number of columns, the number of rows and the total number of squares. Discuss strategies for determining the total. Students may record the information as a number sentence. Allow the students to share and compare their finished work.		*Developing Efficient Numeracy Strategies 2 pg 100-101 Grid paper Dice*
Previous NAPLAN Questions		

6 A group of children share these 21 crayons.
Each child gets 3 crayons.

How many children are there in the group?

    4   5   6   7

○   ○   ○   ○

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28 A bag of 3 apples costs $2.00.

Apples
3 for $2.00

Shade one bubble.
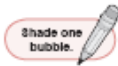
What is the largest number of **apples** that can be bought for $10.00?

    5   6   15   20

○   ○   ○   ○