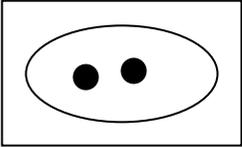
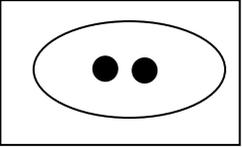


Booragul Public School NSW Syllabus for the Australian Curriculum

– Number and Algebra

Multiplication & Division

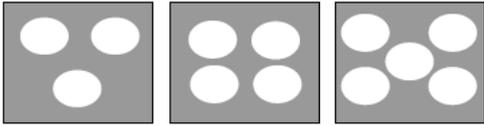
Outcomes Early Stage 1 › describes mathematical situations using everyday language, actions, materials and informal recordings MAe-1WM Communicating › uses objects, actions, technology and/or trial and error to explore mathematical problems MAe-2WM Problem-solving › groups, shares and counts collections of objects, describes using everyday language, and records using informal methods MAe-6NA					group, share, equal, partitive, quotitive.
NUMERACY CONTINUUM Multiplication and Division <i>Using equal groups in multiplication as well as two different types of division.</i>	Forming equal groups <ul style="list-style-type: none"> • Uses perceptual counting and sharing to form groups of specified sizes. • Does not see the groups as composite units and counts each individual item. 	Perceptual multiples <ul style="list-style-type: none"> • Uses groups or multiples in perceptual counting and sharing, e.g. rhythmic or skip counting. • Cannot deal with concealed items. 	Figurative units* <ul style="list-style-type: none"> • Uses equal grouping and counting without individual items visible. • Relies on perceptual markers to represent each group. • Needs to represent the groups before determining the total. 	Repeated abstract units* <ul style="list-style-type: none"> • Uses composite units in repeated addition and subtraction using the unit a specified number of times. • May use skip counting or a double count. • May use fingers to keep track of the number or groups but as the counting occurs. • Is not dependent upon perceptual markers to represent groups. 	
Syllabus pp47 & 48 All activities should involve students manipulating concrete materials. The emphasis is on understanding the modelling of groups of the same size and describing them. Students need to acquire the concept that fair sharing means all shares are equal. After students have shared objects equally, the process can be reversed to begin to develop the link between					

<p>division and multiplication. This can be done by students first sharing a group of objects and then putting back together all of the shares to form one collection. There are two forms of division:</p>				
<p>SHARING – How many in each group? eg ‘If twelve marbles are shared between three students, how many does each get?’</p> <p>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?’</p> <p>Finding the total number of objects that have been shared or grouped can be done incidentally, however, this is emphasised in Stage 1.</p> <p>Multiplication and division should be taught in conjunction with each other as the foundation for conceptual understanding of their inverse relationship.</p>	<p>ELP Syllabus, NES1.2 Sample units of work, pp. 20-22 Developing Efficient Numeracy Strategies Stage 1 (DENS 1), pp. 122-133 Rhythmic counting , (DENS 1), pp. 124-125 Body percussion, (DENS 1), pp. 124-125 Learning object - Penguin count</p>	<p>ELP Syllabus, NES1.2 Sample units of work, pp. 20-22 Developing Efficient Numeracy Strategies Stage 1 (DENS 1), pp.122-133 Ladybirds , (DENS 1), pp. 132-133 Percussion instruments, (DENS 1), pp. 126-127 Learning object - Penguin count</p>	<p>ELP Syllabus, NS1.2 Sample units of work, pp. 47-51 Developing Efficient Numeracy Strategies Stage 1 (DENS 1), pp. 188-203, 268-277. Arrays, (DENS 1), pp. 188-189 Teddy tummies, (DENS 1), pp.268-269 Learning object - arrays Learning object - Penguin count</p>	<p>ELP Syllabus, NS1.2 Sample units of work, pp. 47-51 Developing Efficient Numeracy Strategies Stage 2 (DENS 2), pp.198-206 Teddy target , (DENS 2), pp. 200-201 Double dice multi, (DENS 2), pp.198-199 Learning object - Web link – Virtual dice</p>
<p>Teaching and Learning Activities</p>		<p>Notes/ Future Directions/Evaluation</p>		<p>Date</p>
<p>FORMING EQUAL GROUPS</p> <p>Describing Equal Groups Have some large cards with circles drawn on them. Start with 2 of the cards and place 2 counters in each circle.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>				

Here are some counters. What can you tell me about them? How many counters are there on each card? How many cards are there? How many counters are there altogether? **Emphasis that there are 2 groups and that each groups has 2 counters.** Repeat this process for 3 groups of 4, 5 groups of three, 6 groups of 2, 2 groups of 5 etc.

Farms

In groups, students are given a place mat with three, four or five ovals on it to represent paddocks. They are also given a collection of plastic animals.



Student A rolls a die and all of the students place that number of animals in each paddock. Each student is asked to describe their farm and is encouraged to use numbers in their description. Students record their findings.

Groups of Children

Students skip within a given area eg a netball court. The teacher calls out a number and students make groups of that number.

Possible questions include:

- do all groups have the same number of students?
- how can we check this?

Each group checks the number of students in their group and a student is chosen to count the number of groups. Students line up in rows so the groups can be compared.

NB: discuss equal and unequal groups

Labelling:

Students can work in pairs and make a given number of groups. Ask students to make three equal groups of any number of things. Students describe the groups they have

made to each other, e.g. "I made three groups of four pegs." Show students how the groups can be labelled using numeral and word cards.

3

Groups of

4

Ask the students who made the smallest group. Introduce the idea of one group if students have not already made this. Have word cards for one group, e.g. 1 group of 2, as well as for more than one group. Students can also make any number of groups that are made up of a given number of objects. For example ask students to make any number of groups of three objects.

Making Equal Groups

Use a collecting of objects that are the same eg Teddy Counters, farm animals, dinosaurs etc.

Using 8 teddies. Here are some teddies. Let's see if we can get them into twos. Who can show me how you could put the teddies in twos? How can we check that the groups are the same?

Some students will need to count the number of items in each group by 1 from 1, other students will be able to immediately recognise the number in a each group.

Repeat for a variety of numbers eg 9 into groups of 3, 10 into groups of 5, 12 into groups of 4.

Organising Equal Groups

Present the students with 10 items eg counters.

Can you put the counters into pairs? Once the counters are in pairs Can you make a pattern with the pairs? Support the students to make 5 rows of 2. Can you tell me about each of the rows? (They are the same/equal). Is there another way to make equal rows? (2 rows of 5)What can you tell me about the counters? Can you make a pattern with the counters? **Emphasis that each group contains the same number eg 2,3,4 etc.**

Repeat for 6 and 8.

Pasting Rows

Students cut and paste pictures or use a computer drawing program to create arrays. They are asked to describe their array and use numerals/words to label its features.

Possible questions include:

- is there a different way to make this group?
- what new groups can be made with the same objects?
- how could you check your answer?

Rows

Students are given 12 small plastic animals or other small objects.

Possible questions include:

- can you arrange the animals/counters into equal rows?
- how many different ways can you arrange the animals/counters into equal rows?

Students record and share their solutions.

This activity could be repeated with smaller or larger collections of objects.

Same Number of Groups

Students are asked to make four groups of two objects. It may help some students to have four pieces of paper or a large sheet marked with four squares.

Possible questions include:

- can you replace the four groups of two with four groups of another size?
- can you describe your new groups?

Students use drawings and numerals to record their groups.

Sharing

Students are shown a collection of up to 30 objects. They are asked to discuss what sharing means and to explain how they would share the objects. In small groups, students are asked to select a bag of objects that has been prepared by the teacher. Each bag contains a different number of objects. Students are asked to share the objects between their groups equally and discuss whether it was possible. Students record their solutions.

Sorting Objects – use both equal and unequal groups

Students are given a collection of different-coloured objects to sort into groups.

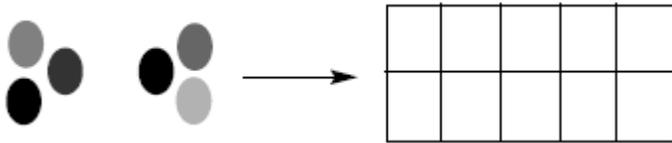
Possible questions include:

- do the groups have the same or a different number of objects?
- can you find a way to make each group equal in number?

Students use drawings and numerals to record their groups.

Ten-frames

Students make two groups of three counters. They are then asked to place the groups onto a ten-frame.



Possible questions include:

- is there the same number of counters in each group?
- how can you tell without counting?
- how many counters are there altogether?

This activity is repeated using two groups of other numbers up to five.

Variation: Two ten-frames could be joined together to make two groups of numbers up to ten or four groups of numbers up to five.

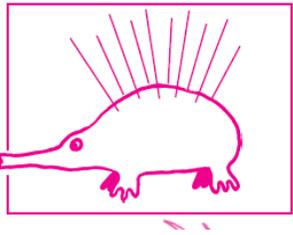
Students could be given a 5 × 5 grid and asked to make groups up to five groups of five.

Story Problems for Discussion

Two children each have four counters. Are these equal groups? How many counters altogether?

If I have a collection of counters to share between three children and I want each child to have the same number of counters, how will I share the counters to be fair? Let students use small containers and counters to develop their own strategy for sharing. Discuss the different methods.

<p>I have 6 jellybeans and I'm going to give each child 2 jellybeans. How many children are there? What did I do to find out? Discuss.</p> <p>Oh! I found 12 more jellybeans! If we are going to be fair and all the children will have the same number of jellybeans, how many more children could have jellybeans? Follow suggestions. Are the groups equal, how many groups, etc.</p>		
<p>PERCEPTUAL MULTIPLES</p> <p>Body Percussion Using body actions, accentuate the multiple count when finding the total number of specified groups. For example, to stress the count for multiples of three, direct the students to tap their heads for the first count, tap their shoulders for the second count and click their fingers for the third. Then repeat the pattern while counting.</p> <p>Canisters Provide the students with a group of objects such as feathers, counters or popsticks. Ask the students to estimate how many items they would put into each canister to make the groups equal. Allow students to check their estimations by using the concrete material to solve the problem.</p> <p>Echidnas Make three or four echidnas from clay or plasticine. Provide the students with a collection of toothpicks. Have the students place equal groups of toothpicks into each echidna. Ask the students to determine the total number of toothpicks, using rhythmic counting.</p>		



Find A Group

Demonstrate making equal groups of objects from classroom items.

Ask the students the following questions:

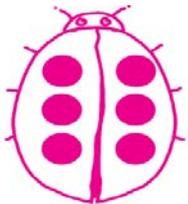
- How many objects in each group?
- How many objects are there altogether?

Kookaburras

Provide a collection of feathers. Instruct the students to place equal groups of feathers onto cardboard outlines of birds. Ask the students to determine the total number of feathers, using rhythmic counting.

Ladybirds

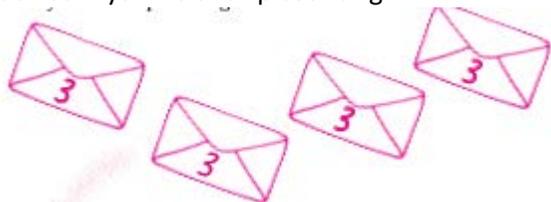
Provide students with outlines of ladybirds and a supply of dot strips. Ensure there are enough dot strips to provide two for each ladybird. Each dot strip should display the same number of dots. Students place two dot strips onto each ladybird. They then determine the total number of dots.



Model the process of counting by twos. Present a pile of counters to the students. Have the students drag down two counters at a time from the pile. Encourage students to use skip counting by twos to determine the total number of counters.

Mail Sort

Pin a row of four envelopes to a board. Ensure the board allows students easy access as they will need to be able to reach the envelopes to complete this activity. Write a numeral, for example three, on the outside of each envelope in the row. Instruct students to cut out pictures from magazines which they will use to “post” into the envelopes. Students “post” the correct number of items into the envelopes according to the numeral written on the outside. Discuss with the students the number of groups and the total number of items posted. Model methods of counting multiples, such as rhythmic or skip counting.



Percussion Instruments

This activity is similar to *Body percussion*. Use percussion instruments to stress the beat and count. With the two above activities, begin by demonstrating the procedure using word patterns rather than the number sequence. For example, say the following pattern while completing actions or tapping an instrument: “Soft, soft, loud, soft, soft, loud.” After the students have practised this procedure with word patterns, model oral counting and then have the class join in the counting sequence. As the students become competent at rhythmic counting, voice the stressed numbers only in the count. Students could, for example, complete the following pattern. For the first and second count they tap their heads. For the third count they call out “three”. They then continue the pattern, voicing only the numbers which are multiples of three. Students form a double circle, with both circles facing each other. One circle stands still and chants a number sequence, accenting the numbers which are multiples of a nominated number. The other circle takes sideward steps in one direction to the beat of the count. On the accented count the students who are moving clap hands with the partner opposite at that count.

<p>Rhythmic Counting As a class or in small groups, collect items to form a specified number of equal groups. Lead the students in counting the total of the groups. Emphasise the multiple count. For example, when counting groups of three, count 1, 2, 3, 4, 5, 6, 7, 8, 9, stressing each multiple of three.</p> <p>Trains Construct train carriages from milk cartons or similar materials. Instruct the students to place equal numbers of Lego® people, or similar items, into each of the carriages. Ask questions similar to those outlined in <i>Find a group</i>.</p>		
<p>FIGURATIVE UNITS</p> <p>Arrays Organise students into pairs. Provide the students with a collection of counters. Instruct one of the pair to make a simple array that is no larger than 5 by 5, with counters. The student then briefly shows the array to his or her partner before screening the counters with a sheet of cardboard. The other student then attempts to construct the same array pattern with counters. The students should then compare the two arrays. Ask the students to find the total number of counters in the array.</p> <p>Arrays: changing groups Arrange nine students into three rows with three students in each row. Pose the following question: “If we add another row of children, how many would there be altogether?” Continue adding rows of students and encourage students to guess how many children there are altogether, prior to counting the students. Variation - Change the number of students in each line.</p> <p>Calculating groups Provide students with a stencil displaying a large number of items. Instruct students to draw rings around groups of items on the stencil. For example: “Put a ring around groups of five items.” Ask the students to determine how many</p>		

groups were made and to use rhythmic counting or skip counting to find the total. Ask the students to determine the number of single items remaining on the sheet.

Dice and grid game

Construct a 6x6 grid for each player. Write the numerals 1 to 36, in sequence, onto the grid, placing one numeral in each square. Each player will also need six sets of dot pattern cards representing the numbers one to six, a numeral die and a dot pattern die. In this activity, the “numeral die” is used to indicate the number of equal groups, and the “dot pattern die” indicates the number of items in each group. Instruct the students to roll the two dice and state the size of each group and the number of equal groups. When the student has stated the size and number of equal groups, ask the student to collect the correct number of dot pattern cards to represent the groups. For example, if the student wishes to make five groups of three, he or she would then select five cards showing three dots on each card. Students then find the total number of dots by rhythmic or skip counting, and place a counter on the corresponding numeral on the grid. In the above example, the student would place the counter on the numeral 15.

The winner is the first to have three counters in a row, horizontally, vertically or diagonally.

Variation - Allow students to use a calculator to determine the total number of dots in the groups. Observe whether the student uses repeated addition or multiplication with the calculator.

Groupies

Provide the students with a collection of items such as counters, marbles or plastic teddies. Direct the students to form a specified number of equal groups using the items, for example, “Make four groups of three counters”.

Students use rhythmic or skip counting to find the total number of items in the specified groups.

Variation - Use dot patterns on dice to represent groups, for example, five groups of two.

Guess my square

Organise students into pairs so that they are sitting opposite each other. Provide each student with an equal number of multi-link cubes or pattern tiles and a sheet of cardboard which will be used as a screen. Ask students to take turns to construct a simple array pattern using the material provided. Students should screen the array from their partner until the pattern is completed. The student then briefly shows the array to the partner before screening the array again. The other student constructs the same array pattern from memory. Instruct students to uncover and compare both array patterns. The students then calculate the total number of items in each array.

Handprints

Make a handprint to represent a group of five. Repeat printing the handprints across a strip of paper. Ask the students to count the number of hands and to find the total number of fingers using rhythmic or skip counting methods.

Variation - Construct a square using four paddle pop sticks to represent groups of four.

Triangle Teddies

Provide the students with a collection of paddle pop sticks and a collection of plastic teddies. Instruct the students to make a triangle using three sticks. Ask the students to then place a teddy on each of the corners of the triangle.

The students then count and record the number of teddies on the triangle. Have the students repeat the process for a second triangle. The students record the total number of teddies placed on the two triangles. Have the students continue to form additional triangles and record the total number of teddies on the triangles.

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 90° to show a new array of five rows of three. Discuss with the students the number

<p>of rows, the number of counters in each row and the total number of counters for each array pattern.</p> <p>Units for two Collect or draw items commonly found in pairs, such as eyes, shoes, socks, or legs. Model the method of counting the items, using rhythmic counting, to the students. Model methods for keeping track of the number of groups as well as the total number of items. Allow opportunities for the students to practise the modelled methods. Demonstrate how the total number of items in a specified number of “groups of two” can be found by counting the first number in each pair silently and voicing the second number. Allow opportunities for the students to practise this counting method.</p> <p>What’s in a square? Construct multiple copies of the grid on BLM on pages 210 and 211 and accompanying picture cards displaying groups of items. Each pair of students will need a copy of the grid, a deck of picture cards and counters of two different colours. Shuffle the picture cards and place them face down before the students. The first player takes a card from the top of the pile and places a counter on the corresponding square on the grid. For example, if a card displaying one item is drawn, the student places his or her counter on the “one group of 1” square at the top left-hand corner of the grid. Players continue to take turns to turn over cards and mark them on the grid. The winner is the first player to make a line of three counters horizontally, vertically or diagonally. To extend this activity introduce numeral cards which indicate the total number of items on each picture card. After the students place a picture card onto the grid, instruct them to determine the total of the groups and place a corresponding numeral card on top of the picture card.</p>		
<p>REPEATED ABSTRACT UNITS</p>		
<p><u>Using Technology to Teach Mathematics:</u> Arrays</p>		

Mathletics: <ul style="list-style-type: none">• Share the Treasure		
Story Books: <ul style="list-style-type: none">• The Doorbell Rang by Pat Hutchins		
Other Activities:		