DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES

Number: Number: Multiplication and Division

Level 1 (Year 1-2)

Teacher Booklet

Level 1 Year 1-2: Number: Multiplication and Division

Task 1	Amanda Bean loves to count. On a plate she has 4 cupcakes. If there were 2 plates, how many cupcakes would there be altogether? If there were 5 plates, how many cupcakes would there be altogether? If there were 9 plates, how many cupcakes would there be altogether?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., (2 × 2) × 6 = 2 × (2 × 6), used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., 7 × 7 = (7 × 5) + (7 × 2) = 35 + 14 = 49.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **NA2-7:** Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Use grouping to solve addition and multiplication problems without counting each object. • Make and identify groupings. • Describe how an array represents a group. • Represent an array in a structured way. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as

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Sharing back/Connect	Select students to share who can explain their reasoning through using materials or drawings or symbols of their groupings of the cupcakes. **Connect**: There are 3 plates with 4 cupcakes on each plate. Write an addition sentence to describe how many cupcakes there are altogether. How many lots of 4 do you have? There are 4 plates with 5 cupcakes on each plate. Write an addition sentence to describe how many cupcakes there are altogether. How many lots of 5 do you have? There are 2 plates with 10 cupcakes on each plate. Write an addition sentence to describe how many cupcakes there are altogether. How many lots of 10 do you have? What pattern can you see?
Teacher Notes	• Read the book "Amanda Bean's Amazing Dream" or watch https://www.youtube.com/watch?v=4nbAsD0iKjo as a shared book during a literacy session. • During the launch, revisit Amanda Bean and some of the things she liked to do mathematically. Discuss with the students whether they always using counting or whether they ever use other ways of grouping and why. • Use the term chunking to indicate to the students that they are using units rather than counting by one. • Have available a range of different discrete materials which students can use to group in chunks/sets. • Facilitate the students to organise the materials in an array rather than discrete sets. XXXX XXXX • Notice the students who use 'lots of' to describe the chunks and reinforce this language. Use this to introduce the multiplication symbol to represent lots of.
Independent Tasks	Mele has 26 leaves and two bags. What are the different ways that she could put the leaves into the bags? Can you record your ideas using drawing and number sentences?
Anticipations	

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Task 2	 Amanda Bean is collecting pinecones and of course we all know what she likes to do. Yes, count them all! As she collects them, she puts them in rows. If there are 3 rows of pinecones and 6 pinecones in each row. How many pinecones are there altogether? What if there are 5 rows of pinecones and 4 pinecones in each row. How many pinecones are there altogether? What if there are 6 rows of pinecones and 5 pinecones in each row. How many pinecones are there altogether?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., (2 × 2) × 6 = 2 × (2 × 6), used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., 7 × 7 = (7 × 5) + (7 × 2) = 35 + 14 = 49.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **NA2-7:** Generalise that whole numbers can be partitioned in many ways.

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Learning Outcomes: Students will be able to:	• Use grouping to solve addition and multiplication problems without counting each object. • Make and identify groupings. • Describe how an array represents a group. • Represent an array in a structured way. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count
Sharing back/Connect	Select students to share who can explain their reasoning through using materials or drawings or symbols of their groupings of the pinecones. **Connect:** If Amanda Bean had 6 pinecones in each row and there were 2 rows, what do you need to do to work out how many pinecones she has altogether? What about if Amanda Bean had 2 pinecones in each row and there were 6 rows, what do you need to do to work out how many pinecones she has altogether? Did you notice that you did not need to make another pattern and could use the first pattern to solve the second one?
Teacher Notes	• During the launch, do choral counting by two starting from 0-30. Record as they are said and draw student attention to the way the pattern repeats after ten in the digits. • Use the term chunking to indicate to the students that they are using units rather than counting by one. • Have available a range of different discrete materials which students can use to group in chunks/sets. • Facilitate the students to organise the materials in an array rather than discrete sets. • Notice the students who use 'lots of' to describe the chunks and reinforce this language. Use this to introduce the multiplication symbol to represent lots of. • Take notice of students who use gesturing to indicate the commutative property and build on their reasoning.
Independent Tasks	Ned has 9 toy cars and gets another 5 toy cars for his birthday. How many toy cars does Ned have now? Marina has 5 shells and collects 19 more on the beach. How many shells does Marina have now?

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	Maka has 4 marbles and wins another 8 marbles after school. How many marbles does Maka have now? Lola has 18 marbles and wins 4 more marbles after school. How many marbles does Lola have now? 3 + 9 = 3 + 19 = 8 + 9 = 18 + 9 =
Anticipations	

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Task 3	 Amanda Bean has been a busy girl. She been sorting out her beans and arranging them as a putiputi. But, oh dear! Now she cannot work out how many different coloured beans she has used. So, she starts again and uses the beans to make more smaller putiputi. If she puts 4 blue beans in each putiputi and she makes 5 putiputi, how many blue beans does she use altogether? If she puts 8 yellow beans in each putiputi and she makes 4 putiputi, how many yellow beans does she use altogether? If she puts 4 red beans in each putiputi and she makes 8 putiputi, how many red beans does she use altogether?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., (2 × 2) × 6 = 2 × (2 × 6), used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., 7 × 7 = (7 × 5) + (7 × 2) = 35 + 14 = 49.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols.

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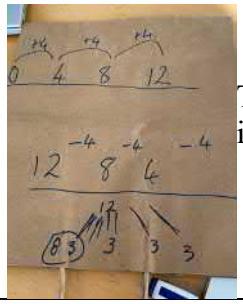
	NA2-7: Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Use grouping to solve addition and multiplication problems without counting each object. • Make and identify groupings. • Describe how an array represents a group. • Represent an array in a structured way. • Explain and represent solution strategies using materials, words, pictures, empty number lines and symbols.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring
Sharing back/Connect	Select students to share who can explain their reasoning through using materials or drawings or symbols of their groupings of the beans. **Connect:** So, if Amanda had 3 groups of 4 blue beans, how many blue beans did she have altogether? Can you use skip counting to find out?  What did you do as you skip counted by 4? Teacher notates for students on a numberline as illustrated in the top line.
Teacher Notes	• During the launch, skip count by two starting from 20 and record the pattern on the board. Have students note the recurring pattern. • Have available a range of different discrete materials which students can use to group in chunks/sets. • Facilitate the students to organise the materials in an array rather than discrete sets and press them to use notation to match their materials. • Facilitate the students to notice that when you skip count you can see groupings of four and you can count the groupings and explain what you have as 3 groups of (lots of) 4 equals 12. • Notice students who use notation and build on their reasoning. • Expect students to represent using symbols (or teacher record for students) as well as materials.

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Independent Tasks	There are 3 plates with 4 cupcakes on each plate. Write an addition sentence to describe how many cupcakes there are altogether. How many lots of 4 do you have? There are 4 plates with 5 cupcakes on each plate. Write an addition sentence to describe how many cupcakes there are altogether. How many lots of 5 do you have? There are 2 plates with 10 cupcakes on each plate. Write an addition sentence to describe how many cupcakes there are altogether. How many lots of 10 do you have? What pattern can you see?
Anticipations	

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Task 4	On the way to school Amanda Bean is counting wheels. She sees 10 kids on their 2-wheeler bicycles. How many wheels does she count altogether? Next, she sees 5 cars. How many wheels does she count on the cars altogether? How many wheels are there altogether in total?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., $(2 \times 2) \times 6 = 2 \times (2 \times 6)$, used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., $7 \times 7 = (7 \times 5) + (7 \times 2) = 35 + 14 = 49$.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **NA2-7:** Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Use grouping to solve addition and multiplication problems without counting each object. • Make and identify groupings. • Describe how an array represents a group. • Represent an array in a structured way. • Explain and represent solution strategies using materials, words, pictures, empty number lines and symbols.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens

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Sharing back/Connect	Select students to share who can explain their reasoning through using drawings and symbols of their groupings of the wheels. **Connect:** So, if Amanda saw 10 tricycles, how many wheels would she see altogether? Can you use skip counting by three to find out? Teacher notates for students on a numberline as illustrated previously and reinforces the concept of ten lots of three.
Teacher Notes	• During the launch, choral count in tens and teacher notate as students count. Have students investigate patterns that emerge. • Have paper and pens available. Also have discrete materials but only if the students need it. Instead press students to draw and group the wheels and notate using numbers. • Facilitate the students to notice that they have made ten groups of three and that this can be recorded as 10 x 3 and 5 groups of 4 which can be recorded as 5 x 4. • Monitor for students using vocabulary lots of and sets of • Expect students to represent using drawings and notation.
Independent Tasks	If Amanda had 3 groups of 4 blue beans, how many blue beans did she have altogether? Can you use skip counting to find out? Use a numberline to show how you skip counted. What did you do as you skip counted by 4? If Amanda had 4 groups of 3 blue beans, how many blue beans did she have altogether? Can you use skip counting to find out? Use a numberline to show how you skip counted. What did you do as you skip counted by 3? What do you notice? Record your ideas.
Anticipations	

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Task 5	 This year Amanda Bean's orange tree has so many oranges on it. She picks up 15 oranges off the tree but that's too many for one bowl! You know what Amanda Bean is like. She likes to put them in groups and so she puts 3 oranges in each bowl. How many bowls does she use? What if she picked 20 oranges and put 4 in each bowl? How many bowls will she use now? What if she picked 30 oranges and put 5 in each bowl? How many bowls will she use now?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., $(2 \times 2) \times 6 = 2 \times (2 \times 6)$, used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., $7 \times 7 = (7 \times 5) + (7 \times 2) = 35 + 14 = 49$.
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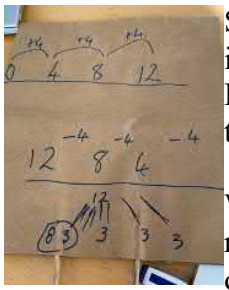
Learning Outcomes: Students will be able to:	• Use equal sharing to solve addition and multiplication problems without counting each object. • Use grouping to solve addition and multiplication problems without counting each object. • Count in groups. • Group objects in different ways. • Describe how an array represents a group. • Represent an array in a structured way. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, undoing, fair share
Sharing back/Connect	Select students to share who can explain their reasoning through using drawings and symbols of their groupings of the oranges and bowls. **Connect:**  So, if Amanda picked 12 oranges and put them into 3 bowls. How many bowls would she use? Did you notice that you measured them out like this? What you multiply you do this. What do you notice about when you share out (divide) the oranges into the bowls? Teacher notates for students on a numberline as illustrated previously and reinforces the concept of 3 lots of 4.
Teacher Notes	• During the launch, revisit the numberline to represent counting in twos. Teacher notates as students count and then shows them the groupings of two that they used. Explore how many groupings they use. • Have paper and pens available. Also have discrete materials but only if the students need it. Instead press students to draw and group the oranges and notate using numbers including skip counting and a numberline. • Facilitate the students to notice that when they share out a group of oranges, they measure them out and work backwards to find out how many groups they have made. • Monitor for students using vocabulary lots of, sets of, measuring out and taking away. • Notice students who recognise that sharing out or dividing undoes joining and multiplication.

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	• Expect students to represent using drawings and notation.
Independent Tasks	If Amanda Bean had 8 pinecones in each row and there were 2 rows, what do you need to do to work out how many pinecones she has altogether? What about if Amanda Bean had 2 pinecones in each row and there were 8 rows what do you need to do to work out how many pinecones she has altogether? Record what you notice.
Anticipations	

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Task 6	Amanda Bean is drawing the sheep she counted to go to sleep. We all know Amanda Bean! She always has to know how many things she can see. She decides that she will put all the sheep in pens so she can work out how many sheep and pens there are. If she has 10 sheep and only 5 can fit in a pen. How many pens does she need to draw? If she has 20 sheep and only 4 can fit in a pen. How many pens does she need to draw? If she has 100 sheep and 10 can fit in a pen. How many pens does she need to draw?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., (2 × 2) × 6 = 2 × (2 × 6), used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., 7 × 7 = (7 × 5) + (7 × 2) = 35 + 14 = 49.
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Learning Outcomes: Students will be able to:	• Use equal sharing to solve addition and multiplication problems without counting each object. • Use grouping to solve addition and multiplication problems without counting each object. • Count in groups. • Group objects in different ways.

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	• Describe how an array represents a group. • Represent an array in a structured way. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share
Sharing back/Connect	Select students to share who can explain their reasoning through using drawings and symbols of their groupings of the sheep and pens. **Connect:** If Amanda Bean drew 10 sheep and decided to put 5 in each pen. How many pens did she need? Can you write this as a subtraction question? If Amanda Bean drew 6 sheep and decided to put 2 in each pen. How many pens did she need? Can you write this as a subtraction question? What do you notice about the pattern you can see?
Teacher Notes	• During the launch, count backwards from 20 counting in twos. Teacher notates as students count and then shows them the groupings of two that they used. Explore how many groupings of two they have. • Have paper and pens available. Also have discrete materials but only if the students need it. Instead press students to draw and group the sheep and notate using numbers including skip counting and a numberline. • Facilitate the students to notice that when they share out a group of objects, they measure them out and work backwards to find out how many groups they have made. Rewrite these using division notation and repeated subtraction. • Notice students who recognise that division is the same as repeated subtraction. Use the numberline to illustrate how they are repeatedly taking away and how in multiplication they are repeatedly adding. • Expect students to represent using drawings and notation.
Independent Tasks	True or false? 15 – 5 = 5 – 15

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	12 + 6 = 6 + 12 22 + 6 = 21 + 7 3 + 3 + 3 = 6 + 3 8 + 4 = 4 + 4 + 4 3 x 3 = 3 x 3 4 x 3 = 4 + 4 + 4 4 x 3 = 3 + 3 + 3 + 3 Record your ideas to explain and justify your reasoning.
Anticipations	

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Task 7	Am In Amanda Bean's dream each sheep pulls out balls of beautiful fleece from their pocket. There are 6 balls of beautiful fleece. Amanda Bean wants to draw a picture of the beautiful fleece and the sheep. Can you show her all the ways she can fairly share out the beautiful fleece with different groups of sheep so that they all get the same amount? There are 10 balls of beautiful fleece. Amanda Bean wants to draw a picture of the beautiful fleece and the sheep. Can you show her all the ways she can fairly share out the beautiful fleece with different groups of sheep so that they all get the same amount? There are 20 balls of beautiful fleece. Amanda Bean wants to draw a picture of the beautiful fleece and the sheep. Can you show her all the ways she can fairly share out the beautiful fleece with different groups of sheep so that they all get the same amount?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., $(2 \times 2) \times 6 = 2 \times (2 \times 6)$, used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., $7 \times 7 = (7 \times 5) + (7 \times 2) = 35 + 14 = 49$.
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Learning Outcomes: Students will be able to:	• Use equal sharing to solve addition and multiplication problems without counting each object. • Use grouping to solve addition and multiplication problems without counting each object. • Count in groups. • Group objects in different ways. • Describe how an array represents a group. • Represent an array in a structured way. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share
Sharing back/Connect	Select students to share who can explain their reasoning through using drawings and symbols of their groupings of the sheep and the wool. **Connect:** We recorded our first number sentences as: 6 x 1 = 1 x 6 3 x 2 = 2 x 3 What would come next with 1x 10 = 10 x 1 = 2 x 5 = 5 x 2 = What pattern can you see?
Teacher Notes	• Have paper and pens available. Also have discrete materials but only if the students need it. Instead press students to draw and group the sheep and the wool and notate using numbers as number sentences. • Facilitate the students to notice that in multiplication the commutative property applies and that they do not need to solve an equation (find the answer) to recognise whether each side is equal. • Notice students who use the notion of flipping or turning around the numbers to explain equivalence. Build on their reasoning by recording these for them. • Expect students to represent using drawings and notation to explain the commutative property of multiplication.

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Independent Tasks	Amanda Bean drew 12 sheep and decided to put 6 in each pen. How many pens did she need? Can you write this as a subtraction question? If Amanda Bean drew 6 sheep and decided to put 2 in each pen. How many pens did she need? Can you write this as a subtraction question? What do you notice about the pattern you can see?
Anticipations	

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Task 8	Out shopping with her mother Amanda Bean stops at the cake shop and watches the baker decorate the top of a small cake with jellybeans. First the baker divides the cake into 2 sections. Amanda Bean notices that she has 12 jellybeans which she carefully shares fairly on each section. How many jellybeans does she put on each section? What fraction of the jellybeans does she put on each section? Out shopping with her mother Amanda Bean stops at the cake shop and watches the baker decorate the top of a small cake with jellybeans. First the baker divides the cake into 4 sections. Amanda Bean notices that she has 12 jellybeans which she carefully shares fairly on each section. How many jellybeans does she put on each section? What fraction of the jellybeans does she put on each section?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., $(2 \times 2) \times 6 = 2 \times (2 \times 6)$, used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., $7 \times 7 = (7 \times 5) + (7 \times 2) = 35 + 14 = 49$.
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Learning Outcomes: Students will be able to:	• Use equal sharing to solve division of sets of problems without counting every object. • Use grouping to solve problems without counting each object.

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	• Count in groups. • Group objects in different ways. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share, fraction
Sharing back/Connect	Select students to share who can explain their reasoning through multiple ways including materials, drawings, and notation. **Connect:** If we have 6 jellybeans to share fairly on two sides of a small cake, how many jellybeans would there be on each side? What is a half of 6? Record as $\frac{1}{2}$ of 6 is 3 6 ÷ 2 = 3 If we have 20 jellybeans to share fairly on two sides of a small cake, how many jellybeans would there be on each side? What is a half of 20? Record as $\frac{1}{2}$ of 20 is 10 20 ÷ 2 = 10 What do you notice?
Teacher Notes	• Facilitate the students to notice that when you are talking about a set of jellybeans that the set is one whole and that they are finding a fraction of that set. Also, draw attention to the denominator as naming what the whole is divided into. • Notice students who can identify the relationship between finding a fraction of a set and division.
Independent Tasks	6 x 1 = 1 x 6 3 x 2 = 2 x 3 What would come next with 1x 10 = 10 x 1 = 2 x 5 = 5 x 2 = What pattern can you see? Record your ideas.

Level 1 Year 1-2: Number: Multiplication and Division

	Record your ideas using drawings and write the numbers to match.
Anticipations	

Level 1 Year 1-2: Number: Multiplication and Division

Task 9	Amanda Bean notices that the baker uses trays to bake cookies on. He has 20 cookies. He shares them equally on 2 trays. What fraction of the cookies are on each tray? How many cookies are on each tray? What if he has 40 cookies and shares them equally across 4 trays. What fraction of the cookies are on each tray? How many cookies are on each tray?
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., $(2 \times 2) \times 6 = 2 \times (2 \times 6)$, used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., $7 \times 7 = (7 \times 5) + (7 \times 2) = 35 + 14 = 49$.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **NA2-7:** Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Use equal sharing to solve division of sets of problems without counting every object. • Use grouping to solve problems without counting each object. • Count in groups. • Group objects in different ways. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words. • Justify that quantity does not change when objects are regrouped.

Level 1 Year 1-2: Number: Multiplication and Division

Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share, fraction
Sharing back/Connect	Select students to share who can explain their reasoning through multiple ways including materials, drawings, and notation. Connect: What is a half of 60? Record as $\frac{1}{2}$ of 60 = 30 60 ÷ 2 = 30 What is a half of 100? Record as $\frac{1}{2}$ of 100 = 50 100 ÷ 2 = 50 What is a quarter of 100? Record as $\frac{1}{4}$ of 100 = 25 100 ÷ 4 = 25 What patterns and relationships do you notice?
Teacher Notes	• Facilitate the students to notice that when you are talking about a set of cookies that the set is one whole and that they are finding a fraction of that one whole set. • Also, draw attention to the denominator as naming what the whole is divided into and that there is a relationship between fractions and division.
Independent Tasks	If there are 6 jellybeans to share fairly on two sides of a small cake, how many jellybeans would there be on each side? What is a half of 6? Can you record this in two different ways? If there are 20 jellybeans to share fairly on two sides of a small cake, how many jellybeans would there be on each side? What is a half of 20? Can you record this in two different ways? What do you notice?
Anticipations	

Level 1 Year 1-2: Number: Multiplication and Division

Task 10	After school Amanda Bean has a bowl of popcorn. Of course, she wants to count how much popcorn is in her bowl so she puts it in as many different rows as she can make. If she has 30 pieces of popcorn what are all the different ways, she organises them? Can you write down a multiplication sentence, a division sentence and a fraction sentence for each way she organises the 30 pieces of popcorn.
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., $(2 \times 2) \times 6 = 2 \times (2 \times 6)$, used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., $7 \times 7 = (7 \times 5) + (7 \times 2) = 35 + 14 = 49$.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **NA2-7:** Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Use equal sharing to solve division of sets of problems without counting every object. • Use grouping to solve multiplication problems without counting each object. • Count in groups. • Group objects in different ways. • Describe how an array represents a group.

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	• Represent an array in a structured way. • Represent, explain, and justify groupings using pictures, numbers, symbols, and words. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share, fraction
Sharing back/Connect	Select students to share who have used multiple ways to organise the popcorn and can explain their reasoning through using multiplication, division, and fractions. **Connect:** What are the different ways you could organise 12 pieces of popcorn? Record the different ways for example as 2 x 6 and 6 x 2; 12 ÷ 6 and 12 ÷ 2; $\frac{1}{2}$ of 12 is 6 What patterns and relationships do you notice?
Teacher Notes	• Have paper and pens available. Also have discrete materials but only if the students need it. Instead press students to draw and use arrays and notate using numbers as number sentences. • Facilitate the students to notice that in multiplication the commutative property applies, and that division undoes multiplication as the inverse. • Notice students who can identify the relationships between multiplication, division and fractions of a set.
Independent Tasks	Record the following like this: $\frac{1}{2}$ of ___ = __ ÷ ___ = What is a half of 60? What is half of 30 What is a half of 100? What patterns and relationships do you notice? Record the following like this:

Level 1 Year 1-2: Number: Multiplication and Division

	$\frac{1}{4}$ of ___ = __ ÷ ___ = What is one quarter of 20? What is one quarter of 40? What is one quarter of 100? What patterns and relationships do you notice?
Anticipations	

Level 1 Year 1-2: Number: Multiplication and Division

Task 11 (optional)	Oh dear, Amanda Bean is very confused! Can you help her to say which of these are true and which are false? 10 x 9 = 9 x 10 34 x 89 = 89 x 10 8 ÷ 2 = 6 10 = 2 x 5 $\frac{1}{2}$ of 8 = 2 $\frac{1}{2}$ of 20 = 10 20 ÷ 10 = 2 200 ÷ 100 = 2 $\frac{1}{2}$ of 100 = 200
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., (2 × 2) × 6 = 2 × (2 × 6), used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., 7 × 7 = (7 × 5) + (7 × 2) = 35 + 14 = 49.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols.

Level 1 Year 1-2: Number: Multiplication and Division

	NA2-7: Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Use equal sharing to solve division of sets of problems without counting every object. • Use grouping to solve multiplication problems without counting each object. • Count in groups. • Group objects in different ways. • Describe how an array represents a group. • Represent an array in a structured way. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share, fraction
Sharing back/Connect	Select students to share who are able to explain and justify their reasoning using materials, pictures and numbers **Connect:** 3 x 2 = 6 and 2 x 3 = 6 so we can say 3 x 2 = 2 x 3 What about 6 ÷ 2 = 3? Can we say 3 ÷ 2 = 6? Why or why not? Can you make a conjecture about what you have noticed?
Teacher Notes	• Facilitate the students to notice the commutative property only applies to addition and multiplication and that it does not apply to division.
Independent Tasks	What are the different ways you could organise 12 green beads? What patterns and relationships do you notice? Record your ideas. What are the different ways you could organise 15 red beads? What patterns and relationships do you notice? Record your ideas. What do you notice?
Anticipations	

Level 1 Year 1-2: Number: Multiplication and Division

Task 12 (optional)	Now Amanda Bean wants to write these addition sentences as multiplication and the subtraction sentences as division. Can you help her? 10 + 10 + 10 = 3 x ? 4 + 4 + 4 + 4 = 2 + 2 + 2 = 10 x 10 = 3 x 5 = 6 x 2 = 20 ÷ 2 = 20 - 10 - ? 12 ÷ 3 = 12 - 6 ÷ 2 = 6 - 50 – 10 – 10 – 10 – 10 – 10 =
Big ideas	Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems. Numbers can be represented in a variety of ways. Equations show relationships of equality between parts on either side of the equal sign. Patterns and relationships can be used, represented and generalised in a variety of ways. Multiplying whole numbers by the base results in one place value shift to the right, dividing whole numbers by the base results in one place value shift to the left. Repeated addition is the same as multiplication. Repeated subtraction is the same as division. The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6. The associative property of multiplication is as follows, e.g., (2 × 2) × 6 = 2 × (2 × 6), used in repeated doubling when finding the product of 4 and 6. The distributive property is as follows, e.g., 7 × 7 = (7 × 5) + (7 × 2) = 35 + 14 = 49.
Curriculum links	**NA1-1:** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **NA1-2:** Know the forward and backward counting sequences of whole numbers to 100. **NA1-4:** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **NA2-6:** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **NA2-7:** Generalise that whole numbers can be partitioned in many ways.
Learning Outcomes: Students will be able to:	• Represent, explain and justify number groupings using pictures, numbers and words. • Explain and justify relationships between numbers in an equation (repeated addition and multiplication; repeated subtraction and division).

Level 1 Year 1-2: Number: Multiplication and Division

	• Represent and explain the commutative property of addition and multiplication. • Justify that quantity does not change when objects are regrouped.
Mathematical language	Times, multiply, equals, repeat, chunking, multiplication, lots of, sets of, twice, double, half, same as, rows, turn around, flip, array, skip count, measuring, tens, dividing, divide, undoing, fair share, fraction
Sharing back/Connect	Select students to share who are able to use materials, drawings Select students to share who are able to explain and justify their reasoning using materials, pictures and numbers. **Connect:** What did you notice in the different patterns? Can you make a conjecture about multiplication and division in what you have noticed?
Teacher Notes	• Facilitate the students to notice the commutative property only applies to addition and multiplication and that it does not apply to division. Discuss the way in which multiplication is repeated addition and division is repeated subtraction.
Independent Tasks	4 x 2 = 8 and 2 x 4 = 8 So, we can say 4 x 2 = 2 x 4 What about 8 ÷ 2 = 4? Can we say 4 ÷ 2 = 8? Why or why not? Record a conjecture about what you have noticed? <u>OR</u> Select one or more of the following assessment tasks (attached at the end of the document) as the independent activity: • N2A Multiplication and Division • N2B Multiplication and Division
Anticipations	

DMIC

DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES
ASSESSMENT TASK

N2 NUMBER MULT DIV: LEVEL 1 Task N2A

There are 48 children in the classroom. The teacher asks them to get into groups which are the same size. Can you show all the different ways that they could get into groups?

DMIC

DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES
ASSESSMENT TASK

NUMBER MULT DIV: LEVEL 1 Task N2B

George had 6 sheets of stickers with 8 stickers on each sheet. How many stickers did he have altogether?

There are 24 strawberries to share fairly with four friends. How many strawberries does each friend get?

In the carpark there are 7 rows with 12 carparks in each row. How many carparks are there altogether?

Write your own multiplication or division problems. Show how you would solve them.