RICH MATHEMATICAL TASK BOOKLET

# NUMBER Multiplication & Division

YEAR 3

## Teacher Booklet

# Task 1

The bossy littlest ant likes the ants to be organised in rows.

If there 5 rows of ants and 7 ants in each row, how many ants are there altogether?

If there 8 rows of ants and 6 ants in each row, how many ants are there altogether?

If there 12 rows of ants and 5 ants in each row, how many ants are there altogether?

Show how you solved the problem using numbers and a representation

## Teacher Notes

Read the book One Hundred Hungry Ants or watch (https://www.youtube.com/watch?v=KXLNe5zfrvc) as a shared book during a literacy session

Before the launch, use quick images as a warm-up to focus on students seeing arrays and multiplying.

During the launch, revisit One Hundred Hungry Ants and some of the patterns the bossy little ant made them use as they marched for the food.

Have available counters which students can use to group in an array. Facilitate the students to organise the materials in an array rather than discrete sets

XXXX
XXXX
XXXX

Notice the students who use 'lots of' or sets of to describe the groups and reinforce this language. Use this to introduce the multiplication symbol to represent these if the students do not use it.

Facilitate students to move beyond counting and to represent the array and multiplication situation using numbers and addition or multiplication.

## Big Ideas

*Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems.*

*Our number system is based on groupings of ten or base ten. Groupings of ones, tens, hundreds, and thousands can be taken apart in different ways. Numbers can be represented in a variety of ways.*

*Equations show relationships of equality between parts on either side of the equal sign.*

*There are arithmetic properties that characterise addition and multiplication as operations. These are the commutative, associative, distributive, and identity properties. Addition and subtraction and multiplication and division have an inverse relationship.*

*Repeated addition is the same as multiplication. The commutative property means that 3 x 6 is the same as 6 x 3 so 6 x 3 = 3 x 6.*

## Curriculum Links

***During Year 3***

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

*Multiply a one- or two-digit number by a one-digit number, using skip counting or known facts (e.g. 4 × 6; 2 × 23)*

## Shareback

Select students to share who have used an array to represent the ants and solve the multiplication task. If no students use this method then model it for them.

Students may use skip counting.

Students may use an array representation (structured).

Students may use repeated addition (structured).

Students may use knowledge of basic facts.

## Connect

How many ants would there be in total if we had:

7 rows with 5 ants in each row.
6 rows with 8 ants in each row.
5 rows with 12 ants in each row.

What do you notice?

## Suggested Learning Outcomes

Represent and explain how an array represents a group.

Represent an array in a structured way.

Explain and justify how numbers can be grouped in an infinite number of ways-the number in a set remains the same no matter how it is arranged or represented.

Explain and justify the commutative property of multiplications.

Represent, explain, and justify relationships between numbers in an operation.

## Mathematical Language

*Times, multiply, equals, repeat, multiplication, lots of, sets of, arrays, same as.*

## Independent Tasks

Aunty has 22 feijoas in one bag and 14 feijoas in another bag. How many feijoas does aunty have altogether?

Mona collected 54 shells and her cousin collected some more. Now they have 92 shells. How many did cousin collect?

Mere has 37 pink beads in one bag. She also has some yellow beads in another bag. Altogether she has 76 beads. How many yellow beads does she have?

Koru picked 31 lemons from his tree. He kept some lemons and gave 16 to the neighbour. How many lemons did Koru keep?

Niko had 24 plums in a bag. He picked some more plums and now he has 73 plums. How many plums did Niko pick?

# Anticipations

Solutions, Misconceptions

## Task 2

The bossy littlest ant has 48 marching ants to organise into rows.

What are all the different ways she can organise them so that there are no ants left over?

## Teacher Notes

Before the launch, do a choral count in fives starting from 0. Record on the board like this:

5 10 15 20
25 30 35 40

Support the students to notice that the ones digit is always a 0 or 5 and connect this to whether the other multiple is an odd or an even number.

Write up multiplication facts for the five times-tables.

Ask student to solve the multiplication facts and make connections between the choral count (skip counting) and multiplication facts

Have available squared paper or dotted paper students can use to cut up and identify the different groupings they can name.

Facilitate the students to identify that an array can be described in more than one way. Take notice of students who use gesturing to indicate the commutative property and build on their reasoning.

Notice the students who identify all the possible groupings in a systematic way. Highlight this to other students.

For the independent task, have counters available.

## Shareback

Select students to share who have used patterns and relationships to find all the different factors for 48. For example, 48 & 1, 24 & 2, 12 & 4, 6 & 8, etc. If no students have used a systematic method to find the factors, then introduce this as a possible solution.

## Big Ideas

*Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems.*

*Our number system is based on groupings of ten or base ten. Groupings of ones, tens, hundreds, and thousands can be taken apart in different ways.*

*Numbers can be represented in a variety of ways.*

*Equations show relationships of equality between parts on either side of the equal sign.*

*There are arithmetic properties that characterise addition and multiplication as operations. These are the commutative, associative, distributive, and identity properties. Addition and subtraction and multiplication and division have an inverse relationship.*

*Repeated addition is the same as multiplication.*

*The commutative property means that 3 x 6 is the same as 6 x 3 so 6 x 3 = 3 x 6.*

## Curriculum Links

***During Year 3***

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

*Multiply a one- or two-digit number by a one-digit number, using skip counting or known facts (e.g. 4 × 6; 2 × 23)*

## Connect

What are the different ways that bossy little ant could organise 24 ants in equal rows? How could you find all the different ways?

## Suggested Learning Outcomes

Represent and explain how an array represents a group.

Represent an array in a structured way.

Explain and justify how numbers can be grouped in an infinite number of ways-the number in a set remains the same no matter how it is arranged or represented.

Explain and justify the commutative property of multiplications.

Represent, explain, and justify relationships between numbers in an operation.

## Independent Tasks

The bossy littlest ant likes the ants to be organised in rows.

If there 9 rows of ants and 5 ants in each row, how many ants are there altogether?

If there 7 rows of ants and 9 ants in each row, how many ants are there altogether?

If there 11 rows of ants and 7 ants in each row, how many ants are there altogether?

Show how you solved the problem using numbers and a representation.

## Mathematical Language

*Times, multiply, equals, repeat, multiplication, lots of, sets of, arrays, same as, factors, product.*

# Anticipations

Solutions, Misconceptions

## Task 3

The bossy littlest Ant marched 8 metres in a minute.
Katie Ant marched 9 times further.
How far did Katie Ant march?

The bossy littlest Ant marched 13 metres in two minutes.
Soane Ant marched 5 times further.
How far did Soane Ant march?

The bossy littlest Ant marched 15 metres in three minutes.
Louie Ant marched 6 times further.
How far did Louie Ant march?

## Teacher Notes

Before you launch the task, provide students with counters and ask them to make arrays to represent single digit multiplication tasks and work out the product.

Notice whether students are using repeated addition or arrays to solve the multiplication tasks. Ensure that students are using numbers to represent and press them to move beyond counting.

Expect students to use the structure of multiplication to solve the tasks.

Introduce vocabulary that is related to multiplication including product and repeated addition.

Expect students to represent using drawings and notation including using number sentences.

For the independent task, have counters or grid paper available for the students.

## Shareback

Select students to share who have used repeated addition to represent and solve the comparison multiplication problem and can connect this to multiplication.

## Big Ideas

*Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems.*

*Our number system is based on groupings of ten or base ten. Groupings of ones, tens, hundreds, and thousands can be taken apart in different ways.*

*Numbers can be represented in a variety of ways.*

*Equations show relationships of equality between parts on either side of the equal sign.*

*There are arithmetic properties that characterise addition and multiplication as operations. These are the commutative, associative, distributive, and identity properties. Addition and subtraction and multiplication and division have an inverse relationship.*

*Repeated addition is the same as multiplication.*

*The commutative property means that 3 x 6 is the same as 6 x 3 so 6 x 3 = 3 x 6.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

*Multiply a one- or two-digit number by a one-digit number, using skip counting or known facts (e.g. 4 × 6; 2 × 23)*

## Connect

The bossy littlest Ant marched 21 metres in five minutes.

Lily Ant marched 4 times further.

How could you work out how far Lily Ant marched using repeated addition?

## Suggested Learning Outcomes

Solve multiplication problems involving comparisons.

Identify the link between repeated addition and multiplication.

Explain and justify how numbers can be grouped in an infinite number of ways-the number in a set remains the same no matter how it is arranged or represented.

Explain and justify the commutative property of multiplication.

## Independent Tasks

The bossy littlest ant has 24 marching ants to organise into rows.

What are all the different ways she can organise them so that there are no ants left over?

The bossy littlest ant has 36 marching ants to organise into rows.

What are all the different ways she can organise them so that there are no ants left over?

The bossy littlest ant has 60 marching ants to organise into rows.

What are all the different ways she can organise them so that there are no ants left over?

## Mathematical Language

*Times, multiply, equals, multiplication, lots of, sets of, arrays, same as, product, repeated addition.*

# Anticipations

Solutions, Misconceptions

## Task 4

When ants see food, they run very fast.

Nikki Ant can run 14 metres every minute towards bread.
How far does Nikki Ant run in 9 minutes?

Tyler Ant can run 23 metres every minute towards cake.
How far can Tyler Ant run in 9 minutes?

Make sure you can explain and justify your explanation in different ways.

## Teacher Notes

Give the students a timestable grid for 2s and 10s and ask students to solve them and record their time (in a non-public way).
You can generate grids through: http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm

Through this unit, they will work on multiplication facts and try and beat their own time.

During the launch, show students of different arrays (e.g., lines of people, windows in an apartment block, coconut trees in lines). Ask them if there is a quick way of working out how many objects there are without counting them all.

Notice whether students partition the two-digit numbers using the distributive property (e.g., $10 \times 9 + 4 \times 9$).

Facilitate the students to notice that they are solving rate problems and that these can be shown as ratios as in the connect.

Introduce vocabulary that is related to multiplication including product, repeated addition, rate.

Expect students to represent using drawings and notation including using number sentences.

For the independent task, have counters or grid paper available for the students.

## Big Ideas

*Numbers can be partitioned and combined to solve more complex addition and subtraction and simple multiplication and division problems.*

*Our number system is based on groupings of ten or base ten. Groupings of ones, tens, hundreds, and thousands can be taken apart in different ways.*

*Numbers can be represented in a variety of ways.*

*Equations show relationships of equality between parts on either side of the equal sign.*

*There are arithmetic properties that characterise addition and multiplication as operations. These are the commutative, associative, distributive, and identity properties. Addition and subtraction and multiplication and division have an inverse relationship.*

*Repeated addition is the same as multiplication.*

*The commutative property means that 3 x 6 is the same as 6 x 3 so 6 x 3 = 3 x 6.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

*Multiply a one- or two-digit number by a one-digit number, using skip counting or known facts (e.g. 4 × 6; 2 × 23)*

## Shareback

Select students to share who have systematically drawn on the rate increase to show how the distance increases. Alternatively, if no students have used this method, then select students who have used repeated addition and use this to illustrate the connection.

## Connect

The littlest ant thinks that she can solve the problem using a table. This is how she represented Nikki Ant:
1:14
2:28
3:42
She wants to use a table to represent Tia Ant who will run 5 metres every minute for spinach. How would the littlest ant represent that on a table to find how far Tia Ant ran in 9 minutes?

## Suggested Learning Outcomes

Solve multiplication problems involving rates.

Identify the link between repeated addition and multiplication.

Identify the link between an array and multiplication.

Explain using a representation how a distance can increase by a set amount over time (e.g., if 1 minute is 7 minutes then 2 minutes will be 14 minutes).

Explain and justify how numbers can be grouped in an infinite number of ways-the number in a set remains the same no matter how it is arranged or represented.

## Independent Tasks

Work with a partner to make flash cards to practice your 2s and 10s times-tables. Write the equation on one side and the answer on the other side. Test each other.

Solve the following problems:
$8 \times 7 =$
$4 \times 11 =$
$15 \times 6 =$
$22 \times 8 =$

## Mathematical Language

*Times, multiply, equals, multiplication, lots of, sets of, arrays, same as, product, repeated addition, rate.*

# Anticipations

Solutions, Misconceptions

## Task 5

Lucia is solving the following problems:

4 × 8 = 32
8 × 4 =

23 × 7 = 161
7 × 23 =

She says that she does not have to work the answer out for the second equation in each set.

Do you agree with Lucia?
What do you notice?

Make a conjecture and use numbers and the material to explore and prove the conjecture.

## Teacher Notes

Before the launch, do a choral count in threes starting from 0. Record on the board like this:

3 6 9 12 15 18 21 24 27 30
33 36 39
Write up multiplication facts for the three times-tables.

Ask student to solve the multiplication facts and make connections between the choral count (skip counting) and multiplication facts

Have counters or grid paper available for the students to use to explore and prove their conjectures.

Notice whether students can identify that the equations would have the same product without calculating.

When students have made the conjectures, record this on the board and encourage students to ask questions and work with them to refine the conjecture and improve it using mathematical language.

Provide students with time to explore their conjecture and test it with other numbers and with concrete material.

For the independent task, have counters or cubes available.

## Big Ideas

*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.*

*The commutative property means that 3x6 is the same as 6x3 so 6 x 3 = 3 x 6.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

*Multiply a one- or two-digit number by a one-digit number, using skip counting or known facts (e.g. 4 × 6; 2 × 23)*

## Shareback

Select students to share who recognise and explain the commutative property in multiplication. In proving the conjectures select students to share in a way that builds on ideas in the following sequence:

Arguments that use specific numerical examples (different types of numbers).

Arguments that use a specific concrete example (an array or model).

Arguments that use a concrete model to generalise (indicating the array would work for any number no matter how big or small).

## Connect

Does the conjecture work for other operations? [addition, subtraction, division]
Represent your conjecture using symbols in a number sentence.
[ ▲ × ★ = ★ × ▲ ] or [a × b = b × a]

## Suggested Learning Outcomes

Develop a conjecture about the commutative property in multiplication.

Identify that the commutative property is true for addition and multiplication.

Explore and prove a conjecture using material.

## Independent Tasks

Practice your 2 and 10 times-tables with your flash cards and a partner.
Make flash cards to practice your 5 and 3 times-tables.

Are these number sentences true or false? Explain why.
10 × 9 = 9 × 10
6 + 6 + 6 + 6 = 4 × 3
30 = 3 × 10
34 × 89 = 89 × 10
7 × 3 = 7 + 7 + 7
Find the missing number:
23 × 6 = 6 ×_
5 + 5 + 5 + 5 = 5 ×_
_= 11 × 6
_+ 8 + 8 + 8 + 8 = 5 × 8

## Mathematical Language

*Times, multiply, equals, multiplication, lots of, sets of, arrays, same as, product, repeated addition, rate.*

# Anticipations

Solutions, Misconceptions

## Task 6

The ants are in rows to march off get food. Bye bye Ants!

There are 35 ants, and they get into rows of 5.
How many rows altogether will there be?

There are 99 ants, and they get into rows of 9.
How many rows altogether will there be?

There are 72 ants, and they get into rows of 6.
How many rows altogether will there be?

## Teacher Notes

Give the students a timestable grid for 3s and 5s and ask students to solve them and record their time (in a non-public way). You can generate grids through: http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm

Have counters available for the students to use to model the problem.

Facilitate the students to notice that using structure to solve the tasks is quicker and easier than counting or using trial and error.

This task focuses on dividing a collection of objects into a given number of equal groups. This is called sharing division or partitive division.

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. This would be written using division notation or repeated subtraction.

Notice students who recognise that division is the same as repeated subtraction. Use a number-line to illustrate how they are repeatedly taking away and how in multiplication they are repeatedly adding.

For the independent task, have counters available.

## Shareback

Select students to share who have used a structured way to divide the ants.

This could include using an array, using the inverse relationship, or dividing in parts. If no students solve the task in a structured way, then model this for the students.

## 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.*

*Repeated subtraction is the same as division.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

Divide whole numbers by a one-digit divisor with no remainders, using grouping
(e.g. 24 ÷ 3, 32 ÷ 4)

## Connect

Tito Ant put all the ants into rows like this to find the number of rows:

x x x x x
x x x x x
x x x x x
x x x x x
x x x x x
x x x x x
x x x x x

What does this tell you about the relationship between multiplication and division?

## Suggested Learning Outcomes

Represent and explain how an array represents a group.

Represent an array in a structured way.

Use grouping to solve division problems without counting each object.

Solve division problems involving dividing a two-digit number with a one-digit number with no remainders.

## Independent Tasks

Use your flash cards to practice your times-tables for the 2s, 3s, 5s, 10s. Write out any that you don't know and repeat the fact to yourself in a quiet voice four times.

The ants are in rows to march to get food.

There are 66 ants, and they get into rows of 6.
How many rows altogether will there be?

There are 75 ants, and they get into rows of 5.
How many rows altogether will there be?

There are 42 ants, and they get into rows of 7.
How many rows altogether will there be?

## Mathematical Language

*Divide, dividend, divisor, array, inverse relationship, multiple, rows, columns.*

# Anticipations

Solutions, Misconceptions

## Task 7

Timo is sorting sunflower seeds into packets to sell at market day.

He has 42 seeds to put into 3 packets.
How many seeds will be in each packet?

He has 52 seeds to put into 4 packets.
How many seeds will be in each packet?

He has 78 seeds to put into 6 packets.
How many seeds will be in each pack?

## Teacher Notes

Give the students a timestable grid for 2s and 10s and ask students to solve them and record their time (in a non-public way). You can generate grids through: http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm

See if they have improved on their previous time.

Have counters available for the students to use to model the problem.

Facilitate the students to notice that using structure to solve the tasks is quicker and easier than counting or using trial and error.

This task focuses on dividing a collection of objects into a given number of equal groups. This is called sharing division or partitive division.

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. This would be written using division notation or repeated subtraction.

Expect the students to record using division notation.

For the independent task, have counters available.

## Shareback

Select students to share who have used a structured way to divide the seeds.

This could include using an array, using the inverse relationship, or dividing in parts. If no students solve the task in a structured way, then model this for the students.

## 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.*

*Repeated subtraction is the same as division.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

*Divide whole numbers by a one-digit divisor with no remainders, using grouping (e.g. 24 ÷ 3, 32 ÷ 4*

## Connect

Timo thought he could find out how many sunflower seeds would be in each packet by using this method:
30 ÷ 3 = 10
12 ÷ 3 = 4
10 + 4 = 14
Does this work?

How would Timo solve the other problems?

## Suggested Learning Outcomes

Represent and explain how an array represents a group.

Represent an array in a structured way.

Use grouping to solve division problems without counting each object.

Solve division problems involving dividing a two-digit number with a one-digit number with no remainders.

## Independent Tasks

Use your flash cards to practice your times-tables for the 2s, 3s, 5s, 10s. Write out any that you don't know and repeat the fact to yourself in a quiet voice four times.

Solve the problems below:

72 ÷ 8 =

55 ÷ 5 =

36 ÷ 3 =

60 ÷ 4 =

## Mathematical Language

*Divide, dividend, divisor, array, inverse relationship, multiple, rows, columns.*

# Anticipations

Solutions, Misconceptions

# Task 8

Leva is helping to arrange some of the baskets of taro for gifts for a hifi ulu (hair-cutting ceremony). He has 96 taro.

Leva wants to put 4 taro in each basket. How many baskets can he fill?

If Leva wants to put 8 taro in each basket. How many baskets can he fill?

If Leva wants to put 2 taro in each basket. How many baskets can he fill?

## Teacher Notes

Give the students a timestable grid for 3s and 5s and ask students to solve them and record their time (in a non-public way). You can generate grids through: http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm
See if they have improved on their previous time.

Have available counters or pictures of taro for the students to model the problem if needed.

Facilitate the students to notice that using structure to solve the tasks is quicker and easier than sharing by fours or using trial and error.

Expect students to represent using an array and other structured solution strategies.

This task focuses on repeatedly subtracting a group from a total number until nothing is left. This is called subtraction division or quotitive division.

For the independent task, have counters or jellybeans available.

## Shareback

Select students to share who have used a structured way to split the taro including using an array and splitting, dividing in parts, or using the inverse relationship with multiplication.

If no students solve the task in a structured way, then model this for the students.

## Big Ideas

*Objects in a set can be grouped and counted to get a final total.*

*Numbers can be grouped in an infinite number of ways - the number in a set stays the same no matter how it is arranged or represented.*

*There are patterns to the ways numbers are formed.*

*Objects in a set can be grouped in twos or fours to get a final total.*

*An array can represent a group.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

Divide whole numbers by a one-digit divisor with no remainders, using grouping
(e.g. 24 ÷ 3, 32 ÷ 4)

## Connect

Record the equations and results for the three problems:

96 ÷ 4 = 24
96 ÷ 8 = 12
96 ÷ 2 = 48

What patterns do you notice?

## Suggested Learning Outcomes

Divide a set of objects by two, four, and eight.

Use grouping to solve division problems without counting each object.

Describe how an array represents a group.

Represent an array in a structured way.

Divide using partial quotients.

## Independent Tasks

Use your flash cards to practice your 2, 3, 5, and 10 times-tables. Note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

Leva is helping to arrange some of the baskets of taro for gifts for a hair-cutting ceremony. He has 70 taro.

Leva wants to put 5 taro in each basket. How many baskets can he fill?

If Leva wants to put 10 taro in each basket. How many baskets can he fill?

If Leva wants to put 2 taro in each basket. How many baskets can he fill?

If Leva wants to put 7 taro in each basket. How many baskets can he fill?

What patterns do you notice?

## Mathematical Language

*Divide, equal groups, chunking, array, sets.*

# Anticipations

Solutions, Misconceptions

# Task 9

Tiare is helping to make some ‘ei katu.

She has 78 red flowers.

Tiare would like to put 6 red flowers in each ‘ei katu. How many can she make?

If Tiare would like to put 2 red flowers in each ‘ei katu. How many can she make?

If Tiare would like to put 3 red flowers in each ‘ei katu. How many can she make?

## Teacher Notes

Give students a grid for the 2s, 3s, 5s, and 10s and ask students to solve them and record their time (in a non-public way). http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm

Use the times-table grids for 2s, 3s, 5s, 10s as a warm-up activity throughout the rest of the year.

Have available counters or pictures of flowers for the students to model the problem if needed.

Facilitate the students to notice that using structure to solve the tasks is quicker and easier than sharing by six or using trial and error.

Expect students to represent using an array and other structured solution strategies.

Notice whether students use the inverse relationship between multiplication and division.

This task focuses on repeatedly subtracting a group from a total number until nothing is left. This is called subtraction division or quotitive division.

For the independent task, have counters available.

## Shareback

Select students to share who have used a structured way to split the flowers including using an array and splitting, dividing in parts, or using the inverse relationship with multiplication.

If no students solve the task in a structured way, then model this for the students.

## Big Ideas

*Objects in a set can be grouped and counted to get a final total.*

*Numbers can be grouped in an infinite number of ways - the number in a set stays the same no matter how it is arranged or represented.*

*There are patterns to the ways numbers are formed.*

*Objects in a set can be grouped in twos or fours to get a final total.*

*An array can represent a group.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

Divide whole numbers by a one-digit divisor with no remainders, using grouping
(e.g. 24 ÷ 3, 32 ÷ 4)

## Connect

Tiare thinks that she can work out how many ‘ei katu she can make by changing the problem to:

6 × _ = 78

Will this work?

## Suggested Learning Outcomes

Divide a set of objects by two, three and six.

Use grouping to solve division problems without counting each object.

Identify patterns in division when dividing with related divisors.

Describe how an array represents a group.

Represent an array in a structured way.

Divide using partial quotients.

## Independent Tasks

Use your flash cards to practice your 2, 3, 5, and 10 times-tables. Note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

Sosefina is making goodie bags for her birthday.

Sosefina has 36 M&Ms to put into 3 bags.
How many M&Ms will be in each bag?

Sosefina has 80 jellybeans to put into 5 bags.
How many jellybeans will be in each bag?

Sosefina has 28 lollipops. She wants to put 2 in each bag.
How many bags can she fill?

Sosefina has 36 fruitbursts. She wants to put 4 in each bag.
How many bags can she fill?

## Mathematical Language

*Divide, equal groups, chunking, array, sets.*

# Anticipations

Solutions, Misconceptions

# Task 10

At Garden to Table the classes are planting potatoes. They are trying to work out which class will have the most potato plants.
Can you help them by working out which way would get the most?

Room One divides a bag of 32 seedling potatoes between two groups.

Room Two divides a bag of 48 seedling potatoes between four groups.

Room Three divides a bag of 76 seedling potatoes between eight groups.

What fraction of the bag of seedling potatoes does each group in the different classes get? How many seedling potatoes do they get?

## Teacher Notes

Give students a grid for the 2s, 3s, 5s, and 10s and ask students to solve them and record their time (in a non-public way). http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm

Ask them to see whether they have beaten their previous time.

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.

## Shareback

Select students to share who have divided the bags of seedling potatoes using grouping, chunking, or structure rather than sharing individually.

## Connect

If there are 12 seedling potatoes to share in two bags. How many potatoes would each bag have?
What is half of 12?
Record as $12 \div 2 = 6$ and $\frac{1}{2}$ of $12 = 6$

If there are 20 seedling potatoes to share in four bags. How many potatoes would each bag have?
What is quarter of 20?
Record as $20 \div 4 = 5$ and. $\frac{1}{4}$ of $20 = 5$

What do you notice?

## 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.*

*Repeated addition is the same as multiplication.*

*Repeated subtraction is the same as division.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

Divide whole numbers by a one-digit divisor with no remainders, using grouping
(e.g. 24 ÷ 3, 32 ÷ 4)

## Suggested Learning Outcomes

Divide a set of objects by two, three and six.

Use grouping to solve division problems without counting each object.

Identify patterns in division when dividing with related divisors.

Describe how an array represents a group.

Represent an array in a structured way.

Divide using partial quotients.

## Mathematical Language

*Times, multiply, equals, multiplication, lots of, sets of, divide, half, division, quarter, fair share, fraction, eighth.*

## Independent Tasks

Use your flash cards to practice your 2, 3, 5, and 10 times-tables. Note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

Record the following as division and as fractions:

Example: What is a half of 60?

$\frac{1}{2}$ of 60 = 30

60 ÷ 2 = 30

What is half of 20?

What is one quarter of 40?

What is half of 80?

What is half of 100?

What is a quarter of 100?

What is half of 60?

What is one quarter of 60?

What patterns and relationships do you notice?

# Anticipations

Solutions, Misconceptions

## Task 11

The baker has baked 65 cupcakes.
She shares them equally on 5 trays.
What fraction of the cupcakes are on each tray?
How many cupcakes are on each tray?

The baker has baked 69 cupcakes.
She shares them equally on 3 trays.
What fraction of the cupcakes are on each tray?
How many cupcakes are on each tray?

## Teacher Notes

Give students a grid for the 2s, 3s, 5s, and 10s and ask students to solve them and record their time (in a non-public way). http://www.mental-arithmetic.co.uk/multiplication-grids-pdf-generator.htm

Ask them to see whether they have beaten their previous tim

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.

## Shareback

Select students to share who have divided the cupcakes using grouping, chunking, or structure rather than sharing individually.

## Connect

What rule could you use to find a unit fraction of a set?

How do you find one half? How do you find one third? How do you find one fifth?

Does this always work?

## 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.*

*Repeated addition is the same as multiplication.*

*Repeated subtraction is the same as division.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

Divide whole numbers by a one-digit divisor with no remainders, using grouping
(e.g. 24 ÷ 3, 32 ÷ 4)

## Suggested Learning Outcomes

Divide a set of objects by three, and five.

Find a third of a set.

Find a fifth of a set.

Use grouping to solve division problems without counting each object.

Describe how an array represents a group.

Divide using partial quotients.

Identify the link between division and fractions.

## Mathematical Language

*Times, multiply, equals, multiplication, lots of, sets of, divide, half, division, quarter, fair share, fraction, eighth.*

## Independent Tasks

Use your flash cards to practice your 2, 3, 5, and 10 times-tables. Note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

The baker has baked 45 cupcakes.
She shares them equally on 5 trays.
What fraction of the cupcakes are on each tray?
How many cupcakes are on each tray?

The baker has baked 51 cupcakes.
She shares them equally on 3 trays.
What fraction of the cupcakes are on each tray?
How many cupcakes are on each tray?

# Anticipations

Solutions, Misconceptions

# Task 12

What is the missing number:

$12 + 12 + 12 + 12 + 12 = 12 \times \_$

$42 + 42 + 42 + 42 = \_ \times 42$

$21 \times 14 = \_ \times 21$

$\frac{1}{2}$ of $22 = 22 \div \_$

$\frac{1}{4}$ of $\_ = 16 \div 4$

$64 \div 2 = \_$ of $64$

$124 \div 3 = \frac{1}{3}$ of $\_$

$\_ \times 5 = 5 \times 16$

What patterns and relationships did you use to find the missing numbers?

What conjectures can you make?

## 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.

Notice whether students use relational reasoning rather than calculating to find the missing numbers.

## Shareback

Select students to share who can find the missing number sentences by using the relationships across the equals sign.

## 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.*

*Repeated addition is the same as multiplication.*

*Repeated subtraction is the same as division.*

## Curriculum Links

*Recall multiplication and corresponding division facts for 2s, 3s, 5s and 10s*

Divide whole numbers by a one-digit divisor with no remainders, using grouping
(e.g. $24 \div 3$, $32 \div 4$)

Multiply a one- or two-digit number by a one-digit number, using skip counting or known facts
(e.g. $4 \times 6$; $2 \times 23$)

## Connect

What did you notice in the different patterns?

Can you make a conjecture about multiplication, division, and fractions from what you have noticed?

## Suggested Learning Outcomes

Identify number sentences which are true and false involving multiplication and division.

Use relationships across the equals sign to identify whether number sentences are true or false.

Make conjectures about the properties of multiplication and division.

## Independent Tasks

Select one or more of the following assessment tasks (attached at the end of the document) as the independent activity:

Task 1 - Multiplication and Division Problems

Task 2 - Multiplication and Division Problems

## Mathematical Language

*Times, multiply, equals, multiplication, lots of, sets of, divide, half, division, repeated addition, fraction, commutative property.*

# Anticipations

Solutions, Misconceptions

# Assessment Task 1 - Multiplication and Division - Year 3

Nancy is practising her netball shots from 5 positions in the circle. She practised 16 shots at each position. How many shots did she practise?

Liliana has 72 carrot seeds to plant. She has space for 4 rows. How many carrot seeds will she plant in each row?

In the hall, there were 14 rows with 19 chairs in each row? How many chairs were there?

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

# Assessment Task  2 - Multiplication and Division - Year 3

Georgia practising her football shots from 7 positions on the field. She practised 12 shots at each position. How many shots did she practise?

Daniel has 78 sunflower seeds to plant. He has space for 3 rows. How many sunflower seeds will he plant in each row?

In the hall, there were 18 rows with 13 chairs in each row? How many chairs were there?

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