RICH MATHEMATICAL TASK BOOKLET

NUMBER Multiplication & Division

YEAR 4

Teacher Booklet

Task 1

For Polyfest each group of dancers is organised into rows.

If there 15 rows of dancers and 9 dancers in each row, how many dancers are there altogether?

If there 8 rows of dancers and 21 dancers in each row, how many runners are there altogether?

If there 44 rows of dancers and 5 dancers in each row, how many dancers are there altogether?

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

Teacher Notes

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

Have available counters or grid paper 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
This should also be used for the connect. Support students to move beyond specific examples and to see how an array proves that the conjecture always works no matter what numbers are used.

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 skip counting and to represent the array and multiplication situation using numbers and addition or multiplication.

Shareback

Select students to share who have used an array to represent the dancers 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.

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 4

Multiply a two-digit by one-digit number and two one-digit whole numbers
(e.g., 23 × 5; 7 × 8)

Recall multiplication and corresponding division facts for 4s and 6s

Connect

Sione is solving the problem and he thinks that he can solve the first task as 15 × 9 or 9 × 15.

Do you agree or disagree with Sione?
Make a conjecture about what you notice.
Prove your conjecture with examples and an array.

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

Aunty has 48 feijoas in one bag and 54 feijoas in another bag. How many feijoas does aunty have altogether?

Koru picked 54 lemons from his tree. He kept some lemons and gave 26 to the neighbour. How many lemons did Koru keep?

Niko had 27 plums in a bag. He picked some more plums and now he has 73 plums. How many plums did Niko pick?

Mona collected 163 shells and her cousin collected some more. Now they have 202 shells. How many did cousin collect?

Mere has 126 pink beads in one bag. She also has some yellow beads in another bag. Altogether she has 301 beads. How many yellow beads does she have?

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 2

Tiana is setting out chairs in church. She has 96 chairs to organise into rows.

What are all the different ways she can organise them so that there are the same number of chairs in every row?

Teacher Notes

Before the launch 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

This activity will be used throughout the unit and should be used as a warm-up throughout the year to develop fluency with times-tables

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.

Introduce the term factors and products to the students.

For the independent task, have counters, grid paper, and other material available for students to build a concrete proof.

Shareback

Select students to share who have used patterns and relationships to find all the different factors for 96. For example, 96 & 1, 48 & 2, 24 & 4, 12 & 8, etc. If no students have used a systematic method to find the factors, then introduce this as a possible solution.

Connect

What are all the possible factors for 12?

What are all the possible factors for 24?

How would you explain factors to a younger person?

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 4

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8)

Recall multiplication and corresponding division facts for 4s and 6s

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.
Identify factors for numbers.
Recognise that numbers can have many factors.

Mathematical Language

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

Independent Tasks

Work with a partner and make flash cards to practice your 2, 3, 5, and 10 times-tables. Write the fact on one side and the answer on the other side. Test each other and note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

Tatiana is solving some multiplication problems.
$9 \times 7 = 63$
$7 \times 9 =$

$21 \times 22 = 462$
$22 \times 21 =$

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

Do you agree with Tatiana?
What do you notice?

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

Does this work with other operations? Try it with addition, subtraction, and division.

Anticipations

Solutions, Misconceptions

Task 3

Lotti is thinking about the rides at Rainbows End, and how long you have to wait for each ride so she can plan her day.

The Log Flume can fit 4 riders.
The ride goes 63 times each hour.
How many riders can go on the Log Flume in an hour?

The Fear fall ride can fit 18 riders.
The ride can go 9 times each hour.
How many riders can go on the Fear Fall every hour?

The rollercoaster can fit 28 people.
The ride can go 8 times each hour.
How many riders can go on the rollercoaster every hour?

What ride do you think will have the shortest wait?

Teacher Notes

Before you launch the task, revisit the concept of factors. Discuss what the factors of 8 are. Record as a pot and label on it the number 8. Have balloons coming from the pot with 1, 4, 2, 8 (factors of 8). Repeat with other numbers.

Notice whether students are using repeated addition, arrays, or the area model to solve the multiplication tasks.

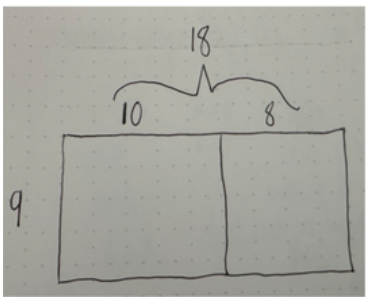
Expect students to use the structure of multiplication to solve the tasks. Introduce vocabulary that is related to multiplication including product, distributive property, repeated addition.

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 and the distributive property to solve the tasks. If no students have used the distributive property, then model this for the students. Model how to record the area model as below [for 18 × 9] 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

During Year 4

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8)

Recall multiplication and corresponding division facts for 4s and 6s

Shareback

Discuss with the students why repeated addition is appropriate for the first task but less efficient for the second task.

Solution One: $63 + 63 + 63 + 63 + 63 + 63$
Solution Two: $(10 \times 9) + (8 \times 9)$

Connect

The Stratosfear ride takes 26 riders.
The ride goes 8 times every hour.
How many riders can go on the rider in an hour?

Describe how you would solve this task using repeated addition.
Describe how you would solve this task using the distributive property.

Suggested Learning Outcomes

Solve multiplication problems involving rates.

Use the distributive property to solve multiplication tasks.

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

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 factors pots and balloons with all the factors for the following numbers:

8	12	16	20
30	45	80	

How would you explain what factors are to a younger person?

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 4

Hoana and her brother Wiremu are comparing their collections.

Wiremu has 14 gemstones. Hoana has eight times as many gemstones.
How many gemstones does Hoana have?

Hoana has 37 Pokemon cards. Wiremu has five times as many Pokemon cards.
How many Pokemon cards does Wiremu have?

Wiremu has 15 marbles, Hoana has twelve times as many marbles.
How many marbles does Hoana have?

Teacher Notes

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

4 8 12 16 20
24 28 32 36 40

Ask students to identify the patterns that they notice.

Write up multiplication facts, for the 4 times-tables,
Ask student to solve the multiplication facts and make connections between the choral count (skip counting) and multiplication facts

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 × 8) + (4 × 8).

Expect students to use vocabulary that is related to multiplication including product, repeated addition, distributive, array, area model.

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. 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.

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

During Year 4

Multiply a two-digit by one-digit number and two one-digit whole numbers
(e.g., 23 × 5; 7 × 8)

Recall multiplication and corresponding division facts for 4s and 6s

Shareback

Select students to share who have used the distributive property to solve the tasks. If no students have used the distributive property, then model this for the students.

Connect

Hoana notices that you can solve 14 × 8 = (10 × 8) + (4 × 8).

She wonders whether you can also solve it as 14 × 8 = (12 × 8) + (2 × 8).

Does this work?

Use the counters and make an array to see whether this works.

What are all the different ways that you could split the numbers to multiply 14 × 8?

Suggested Learning Outcomes

Solve multiplication problems involving comparison.

Identify the link between repeated addition and multiplication.

Identify the link between an array and multiplication.

Use the distributive property to solve a multiplication problem.

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

Make flash cards for the 4 times-tables. Note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

Solve the following problems:
12 × 8 =
11 × 32 =
74 × 6 =
16 × 13 =

Mathematical Language

Times, multiply, equals, multiplication, lots of, sets of, arrays, same as, product, splitting, partitioning, repeated addition, comparison, distributive.

Anticipations

Solutions, Misconceptions

Task 5

Becky is thinking about how far different creatures can move in an hour.

A pig can move 11 metres in an hour.
How far can a pig move in 8 hours?

A polar bear can move 18 metres in an hour.
How far can a polar bear move in 8 hours?

A cheetah can move 74 metres in an hour.
How far can a cheetah move in 8 hours?

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

Teacher Notes

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

6 12 18 24 30
36 32 38 44 40

Ask students to identify the patterns that they notice.

Write up multiplication facts, for the 6 times-tables,
Ask student to solve the multiplication facts and make connections between the choral count (skip counting) and multiplication facts.

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, ratio.

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 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.

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.

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

During Year 4

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8)

Recall multiplication and corresponding division facts for 4s and 6s

Connect

Becky thinks that she can solve the problem using a table. This is how she represented a pig:
1:11
2:22
3:33 ...

Continue the table for Becky.
How would Becky use a table for the polar bear?

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 hour is 11 metres then 2 hours will be 22 metres).
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

Make flash cards for the 6 times-tables. Note the ones that you don't know instantly and practice writing these out and saying it aloud to yourself four times.

Are these number sentences true or false? Explain why.
$23 \times 49 = 49 \times 23 =$
$19 + 19 + 19 + 19 + 19 + 19 + 19 = 19 \times 6$
$700 = 7 \times 100$
$14 \times 7 = (10 \times 7) + 14 + 14$
$8 \times 23 = (8 \times 20) + (8 \times 3)$

Find the missing number:
$42 \times 8 = 8 \times \_$
$14 \times 4 = (10 \times 4) + (\_ \times 4)$
$23 \times 6 = 23 + 23 + 23 + 23 + 23 + \_$
$\_ = 12 \times 5$
$(10 \times \_) + (7 \times 9) = 17 \times 9$

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 6

In the Great Divide, the people in the race begin in rows.

There are 55 people and they get into rows of 5.
How many rows altogether will there be?

There are 52 people and they get into rows of 4.
How many rows altogether will there be?

There are 98 people and they get into rows of 7.
How many rows altogether will there be?

Teacher Notes

Before the launch 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 check their previous time and see whether they have improved.

Read the book The Great Divide or watch (https://youtu.be/7ZSlOqD5h6U) as a shared book during a literacy session.

In the launch, remind the students of the different division aspects of the story.
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.

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

During Year 4

Recall multiplication and corresponding division facts for 4s and 6s

Divide up to three-digit whole number by a one-digit divisor, with no remainder (e.g., 65 ÷ 5)

Connect

To solve the first task, all the runners could be put 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
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.

Solve division problems using a partial quotient strategy.

Independent Tasks

Use the flash cards for the 2, 3, 4, 5, 6 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 runners are in rows to start the race.
There are 65 people and they get into rows of 5.
How many rows altogether will there be?
There are 42 people and they get into rows of 3.
How many rows altogether will there be?
There are 78 people and they get into rows of 6.
How many rows altogether will there be?

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 7

Lani is sorting beads into packets to sell at market day.

She has 106 beads to put into 8 packets.
How many beads will be in each packet?
How many will be left over?

She has 230 beads to put into 15 packets.
How many beads will be in each packet?

She has 260 beads to put into 18 packets.
How many beads will be in each pack?

Teacher Notes

Before the launch give students a grid for the 2s, 3s, 4s, 5s, 6s 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

As you launch the task, 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.

Notice whether students are dividing in parts to solve the tasks.

Expect the students to record using division notation.

Shareback

Select students to share who have used dividing in parts or a partial quotient solution. 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.

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.

Connect

Lani thought she could find out how many beads would be in each packet by using this method:

106 ÷ 8 =
80 ÷ 8 = 10
24 ÷ 8 = 3
10 + 3 = 13 with a remainder of 2

Does this work?
How would Lani solve the other problems?

Suggested Learning Outcomes

Represent and explain how an array or area model represents a group in a structured way.

Solve division problems with remainder.

Solve division problems using a partial quotient strategy.

Independent Tasks

Use the flash cards for the 2, 3, 4, 5, 6 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.

Solve the problems below:
117 ÷ 9 =
156 ÷ 12 =
352 ÷ 32 =
294 ÷ 21 =

Curriculum Links

During Year 4

Recall multiplication and corresponding division facts for 4s and 6s

Divide up to three-digit whole number by a one-digit divisor, with no remainder (e.g., 65 ÷ 5)

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 8

Sose and Lagi are making ula lole for graduation.

They have 105 mini chocolate bars.

They want to put 7 mini chocolate bars on each ula lole.
How many ula lole can they put chocolate bars on?

They have 224 mackintosh lollies.

They want to put 16 mackintosh lollies in each ula lole.
How many ula lole can they put mackintosh lollies on?

They have 461 fruit bursts.

They want to put 21 fruit bursts in each ula lole.
How many ula lole can they put fruit bursts on?

Teacher Notes

Before the launch do a choral count in 25 starting from 200. Record on the board like this:

200 225 250 275
300 325 350 375
400

Ask students to identify the patterns that they notice and to predict further terms.

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

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

Notice whether students use partial quotients to divide or if they draw on the inverse relationship between multiplication and division.

Shareback

Select students to share who have used a structured way to split the lollies 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

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

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.

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.

An array can represent a group.

Curriculum Links

During Year 4

Divide up to three-digit whole number by a one-digit divisor, with no remainder
(e.g., 65 ÷ 5)

Multiply a two-digit by one-digit number and two one-digit whole numbers
(e.g., 23 × 5; 7 × 8)

Connect

Lagi thinks that she can work out how many ula lole she can make by changing the problem to:

7 × _ = 105

Will this work?

Suggested Learning Outcomes

Describe how an array or area model represents a group in a structured way.

Solve division tasks using partial quotients.

Solve division tasks using the inverse relationship between division and multiplication.

Independent Tasks

Use the flash cards for the 2, 3, 4, 5, 6 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.

Sose and Lagi are making ula lole for graduation.
They have 256 fruit bursts.
They want to put 8 fruit bursts on the ula lole.
How many ula lole can they make?

They want to put 16 fruit bursts on the ula lole.
How many ula lole can they make?

They want to put 4 fruit bursts on the ula lole.
How many ula lole can they make?

What patterns do you notice?

Mathematical Language

Divide, equal groups, chunking, array, sets.

Anticipations

Solutions, Misconceptions

Task 9

Solve the problems below:

208 ÷ 13 =

285 ÷ 19 =

572 ÷ 26 =

Teacher Notes

Before the launch give students a grid for the 2s, 3s, 4s, 5s, 6s 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 check whether they have beaten their previous time and to record their new time.

Notice whether students use partial quotients to divide or if they draw on the inverse relationship between multiplication and division.

Expect students to use language related to division.

For the independent task, have counters available.

Shareback

Select students to share who have used a structured way to divide including dividing in parts or using the inverse relationship with multiplication.

Connect

What numbers would you change these into when using partial quotient/distributive property to divide?

284 ÷ 13 =

336 ÷ 21 =

Have children discuss possible number combinations without solving these.

Big Ideas

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

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 4

Divide up to three-digit whole number by a one-digit divisor, with no remainder (e.g., 65 ÷ 5)

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8)

Suggested Learning Outcomes

Describe how an array or area model represents a group in a structured way.

Solve division tasks using partial quotients.

Solve division tasks using the inverse relationship between division and multiplication.

Mathematical Language

Divide, equal groups, chunking, array, sets, partial quotients, inverse relationships.

Independent Tasks

Use the flash cards for the 2, 3, 4, 5, 6 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.

George making goodie bags for his birthday.

George has 102 M&Ms to put into 12 bags.
How many M&Ms will be in each bag?
How many will be left over?

George has 149 jellybeans to put into 12 bags.
How many jellybeans will be in each bag?
How many will be left over?

George has 53 lollipops. He wants to put 3 in each bag.
How many bags can he fill?
How many will be left over?

George has 75 fruitbursts. He wants to put 4 in each bag.
How many bags can he fill?
How many will be left over?

Anticipations

Solutions, Misconceptions

Task 10

Mohammed is solving the following problems:

21 × 45 = 945

45 × 21 =

945 ÷ 21 =

945 ÷ 45 =

He says that he does not have to work the answers as he already knows them.

Do you agree with Mohammed?

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 50 starting from 150. Record on the board like this:

150 200 250 300
350 400 450 500
550 600 650 700

Ask students to identify the patterns that they notice and to predict further terms.

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 and you can solve the division task 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

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

During Year 4

Divide up to three-digit whole number by a one-digit divisor, with no remainder (e.g., 65 ÷ 5)

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8)

Shareback

Select students to share who recognise and explain the inverse relationship of multiplication and division. 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 product no matter how big or small).

Connect

Does the conjecture work for other operations? [addition/subtraction, multiplication/subtraction, addition/division]

Represent your conjecture using symbols [shapes or letters] in a number sentence using if and then...
If h × p = k then k ÷ p = h and k ÷ h = p and p × h = k

Suggested Learning Outcomes

Develop a conjecture about the relationship of multiplication and division.
Identify that the inverse relationship is true for multiplication/division and addition/subtraction.
Explore and prove a conjecture using material.

Independent Tasks

Use the flash cards for the 2, 3, 4, 5, 6 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.

Make an array and record the following as multiplication and division number sentences:

9 by 6

12 by 8

7 by 15

18 by 9

Mathematical Language

Times, multiply, equals, divide, multiplication, sets of, array, inverse relationship.

Anticipations

Solutions, Misconceptions

Task 11

Iosefa is packing panikeke to sell at Pasifika festival.

Iosefa has made 130 panikeke.
He shares them equally on 8 large trays.
What fraction of the panikeke are on each tray?
How many panikeke are on each tray?
How many are left over?

Iosefa has made another 57 panikeke.
He shares them equally on 6 trays.
What fraction of the panikeke are on each tray?
How many panikeke are on each tray?
How many are left over?

Teacher Notes

Before the launch give students a grid for the 2s, 3s, 4s, 5s, 6s 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 check whether they have beaten their previous time and to record their new time

Facilitate the students to notice that when you are talking about a set of objects 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 panikeke using partial quotients or the inverse relationship between multiplication and division.

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 tenth? How do you find one fiftieth?

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.

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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

During Year 4

Divide up to three-digit whole number by a one-digit divisor, with no remainder (e.g., 65 ÷ 5)

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8

Suggested Learning Outcomes

Divide a set of objects by six and eight.

Find a sixth of a set.

Find an eighth of a set.

Divide using partial quotients.

Solve division tasks by using the inverse relationship between multiplication and division.

Identify the link between division and fractions.

Mathematical Language

Times, multiply, equals, multiplication, lots of, sets of, divide, division, fair share, fraction, sixth, eighth.

Independent Tasks

Use the flash cards for the 2, 3, 4, 5, 6 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 86 cupcakes.
She shares them equally on 5 trays.
What fraction of the cupcakes are on each tray?
How many cupcakes are on each tray?
How many are left over?

The baker has baked 65 cupcakes.
She shares them equally on 3 trays.
What fraction of the cupcakes are on each tray?
How many cupcakes are on each tray?
How many are left over?

Anticipations

Solutions, Misconceptions

Task 12

At Garden to Table the classes are planting potatoes. They are trying to work out which class will have the most potato plants.

Who would get the most?

One third of a bag of 39 seedling potatoes
Three quarters of a bag of 32 seedling potatoes
Three eighths of a bag of 48 seedling potatoes

Teacher Notes

Facilitate the students to notice that when you are talking about a set of objects 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 and those who realise that you need to multiply by the numerator.

Shareback

Select students to share who have divided the potatoes using partial quotients or the inverse relationship between multiplication and division and then multiplied to find the set.

Connect

How would you change the rule that you used to find a unit fraction of a set to find ¾ or 3/8?

Does this always work?

Big Ideas

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Repeated addition is the same as multiplication.

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Curriculum Links

During Year 4

Divide up to three-digit whole number by a one-digit divisor, with no remainder (e.g., 65 ÷ 5)

Multiply a two-digit by one-digit number and two one-digit whole numbers (e.g., 23 × 5; 7 × 8

Suggested Learning Outcomes

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

Find a unit fraction of a set.

Find a fraction of a set.

Identify the link between division and fractions.

Mathematical Language

Times, multiply, equals, multiplication, lots of, sets of, divide, division, fair share, fraction, sixth, eighth.

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

Task 2: Multiplication and Division

Anticipations

Solutions, Misconceptions

Assessment Task 1 - Multiplication and Division - Year 4

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 4

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.