RICH MATHEMATICAL TASK BOOKLET

NUMBER & ALGEBRA

YEAR 2

Teacher Booklet

Task 1

Choose a number between 11 – 19 and represent this in as many ways as you can using the tens frames. Record the number sentences that match.

Choose a number between 20 – 30 and represent this in as many ways as you can using the tens frames.

Record addition and subtraction number sentences that match.

Draw the tens frames.

Teacher Notes

Before you launch the task, provide students with a variety of pre-printed tens frames to find combinations. The focus should be on finding combinations without counting so they are using the structure of the number representation.

Ask them to find all the combinations to ten and record the number sentences that match the combinations to 10 using an addition sign. Provide students with multiple tens frames.

Provide markers/pens to students to draw and record their number sentences and the tens frame.

Ask students to re-draw the tens frame until they have an accurate representation.

Notice their representations - are they showing an understanding of groupings of tens and one in place value? Are they using the addition and subtraction sign accurately? 10 + 10 + 3, if 2 tens = 20, then 20 + 3 = 23.

Shareback

Select students to share and record the number sentences generated through use of the tens frames and to draw the tens frames that match.

Big Ideas

Quantity is an attribute of a set of objects and we use numbers (represented by words and symbols) to name specific quantities. A quantity (whole) can be decomposed into different parts, the parts can be composed to form the whole.

Curriculum Links

Group objects in a collection of at least 10, subitise the number of objects in each part, and find the total number in the collection using the parts.

Identify, read, and write whole numbers up to at least 100, and represent them using base 10 structure.

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70)

Connect

Ask students to discuss any patterns in the number sentences: “What do you notice? Can you see any patterns in these number sentences?”

Support students to notice patterns like the commutative property (e.g., 6 + 19 = 19 + 6), inverse property (e.g., if 6 + 19 = 25 then 25 – 6 = 19 or 25 – 19 = 6).

Suggested Learning Outcomes

Represent visual and symbolic patterns for the numbers between ten and thirty.

Represent and explain thinking using pictures, numbers, and symbols.

Independent Tasks

Choose a number between 20 – 30 and draw tens frames that would make the number and write the matching number sentences.

Find different ways to make the number. Draw the tens frames and record the matching number sentences.

Mathematical Language

Number words, add, subtract, equation.

Anticipations

Solutions, Misconceptions

Task 2

Meleana has collected 30 marbles and is putting them in two bags. What are all the different ways that she could put the marbles into the two bags?

Can you record your ideas using drawings and number sentences?

Teacher Notes

Before you launch the task, put money (notes and coins) up to $20 on the whiteboard and ask students to identify the value and order the coins and notes from smallest to largest in terms of value.

Provide students with bags of 30 counters and or other materials (multi-link cubes, etc) to represent marbles.

Provide markers/pens to students to draw and record their number sentences.

Notice their representations - are they showing an understanding of groupings of ten and place value? Are they using the addition sign accurately e.g. 22 + 8 = 30

Shareback

Select students who have used patterns to find different possibilities to share their solution strategies. Record these using both pictorial representations (tens frames and equations).

Highlight different combinations during sharing back.

Big Ideas

Quantity is an attribute of a set of objects and we use numbers (represented by words and symbols) to name specific quantities.

Equations show relationships of equality between parts on either side of the equal sign. The properties of equality are: If the same real number is added or subtracted to both sides of an equation, equality is maintained; If both sides of an equation are multiplied or divided by the same real number (not dividing by 0), equality is maintained; Two quantities equal to the same third quantity are equal to each other.

Curriculum Links

Identify, read, and write whole numbers up to at least 100, and represent them using base 10 structure.

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70).

Connect

Select a student who has developed a systematic way to find all possibilities and ask students to use that way to find all the possibilities for 35 marbles. If no students develop a systematic way then use the following example...

Meleana has worked out a way to find all the different combinations. She begins by putting 35 marbles in one bag and none in the other.
Show using tens frames and record 35 + 0 = 35

Then she knows that the next one will be 34 marbles in one bag and one marble in the other.
Show using tens frames and record 34 + 1 = 35

Can you use Meleana's idea to find all of the different combinations?

Suggested Learning Outcomes

Split and recombine numbers to make groupings to 30.

Use patterns and relationships to solve problems.

Independent Tasks

Litea 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 drawings and number sentences?

Mathematical Language

Number words, add, subtract, equation, equal sign.

Anticipations

Solutions, Misconceptions

Task 3

Solve the equations. What do you notice?

3 + 6 =

20 + 10 =

16 + 20 =

20 + 23 =

36 + 23 =

Represent your thinking using an empty number line.

Teacher Notes

Before you launch the task, write numbers between 0 and 100 on the board. Ask students to identify the number and identify how many tens and ones are in the number for place value. Model or revoice to reinforce place value, e.g., 35 has three tens and 5 ones. Complete this activity as a warm-up throughout the unit of work.

Have concrete material available if needed for students to select (e.g., arrow cards, money in $10 notes and ones, and 100s boards).

Explicitly press for students to use place value language in their explanations.

Expect children to represent their reasoning on an empty number line and track the jumps in either 10's or bigger numbers. If the students do not use these introduce as a representation.

Sets of tens (and tens of tens) can be perceived as single entities e.g. 30 is 3 tens; When we add 40 we are adding 4 tens.

Make explicit 30 + 10 is 3 tens plus 1 ten. This highlights the nested nature of place value. Nested place value is the idea that place value units are included in other place value units, for example, tens are within hundreds, and hundreds are within thousands.

Big Ideas

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 .

Number operations and strategies to solve number operations can be recorded using words, numbers, diagrams, and symbols.

Curriculum Links

Identify, read, and write whole numbers up to at least 100, and represent them using base 10 structure.

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70).

Shareback

Select student solution strategies that focus on the place value and what happens to the tens and ones. Use an empty number line to record adding in tens or larger numbers.

Reinforce the language and concepts of nested place value (e.g., Twenty is 2 tens and 2 tens and 1 ten make 3 tens which is thirty.).

Connect

Ask students to solve the following and use place value language to describe their solutions:

40 + 10 =

44 + 10 =

44 + 20 =

44 + 22 =

44 + 42 =

Suggested Learning Outcomes

Add and subtract groupings of tens.

Represent equations on an empty number line.

Use place value to solve addition/subtraction problems.

Independent Tasks

Look for patterns and use these to help you solve the problems below:

4 + 5 =
14 + 5 =
14 + 15 =
24 + 25=

4 + 3 =
13 + 4 =
14 + 13 =
23 + 24 =
What patterns did you notice as you solved these problems?

Mathematical Language

Tens, ones, hundreds

Anticipations

Solutions, Misconceptions

Task 4

Solve the following problems:

9 – 5 =

19 – 5 =

29 – 10 =

29 – 15 =

89 – 5 =

89 – 35 =

Represent your thinking using an empty number line.

Teacher Notes

Before you launch the task, write numbers between 0 and 100 on the board. Explain to students the rules for rounding numbers, less than 5 round down and more than 5 round up. Ask students to identify the number and round the number to the nearest ten. Complete this activity as a warm-up throughout the unit of work.

Have concrete material available if needed for students to select (e.g., arrow cards, money in $10 notes and ones, and 100s boards).
Explicitly press for students to use place value language in their explanations.

·Expect children to represent their reasoning on an empty number line and track the jumps in either 10's or bigger numbers. If the students do not use these introduce as a representation.

Sets of tens (and tens of tens) can be perceived as single entities e.g. 30 is 3 tens; When we add 40 we are adding 4 tens. Make explicit 30 + 10 is 3 tens plus 1 ten. This highlights the nested nature of place value. Nested place value is the idea that place value units are included in other place value units, for example, tens are within hundreds, and hundreds are within thousands.

Shareback

Select student solution strategies that focus on the place value and what happens to the tens and ones. Use an empty number line to record adding in tens or larger numbers.

Reinforce the language and concepts of nested place value (e.g., Eighty is 8 tens and thirty is 3 tens and 8 tens subtract 3 tens is 5 tens which is 50).

Big Ideas

Numbers are used to name specific quantities. Numbers can be decomposed into parts in an infinite number of ways without the quantity changing.

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.

Curriculum Links

Identify, read, and write whole numbers up to at least 100, and represent them using base 10 structure.

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70).

Identify the nearest ten to any whole number up to 100.

Connect

Ask students to solve the following and use place value language to describe their solutions:

7 – 3 =

50 – 10 =

57 – 10 =

57 – 13 =

67 – 33 =

Suggested Learning Outcomes

Add and subtract groupings of tens.

Represent equations on an empty number line.

Use place value to solve addition/subtraction problems.

Independent Tasks

Solve the following problems:

40 + 10

50 + 10 =

10 + 34 =

20 + 30 =

24 + 30 =

24 + 34 =

What patterns do you notice?

Mathematical Language

Tens, ones, place value.

Anticipations

Solutions, Misconceptions

Task 5

Lily has $14 in her piggybank. She is given $15 for her birthday. How many money does Lily have now?

Luka has $38 in his piggybank. He spends $11. How much money does he have left?

Tali has $22 in her piggybank. She is given $35 for her birthday. How many money does Tali have now?

Luka has $66 in his piggybank. He spends $23. How much money does he have left?

61 + 35 =

75 – 42 =

Teacher Notes

Before you launch the task, write the following equations on the board:
10 + _ = 50 20 + _ = 50 30 + _ = 50 40 + _ = 50
Ensure that students maintain the use of place value language to solve the equations and draw on patterns. Complete this activity as a starter throughout the unit of work using tens numbers up to 100.

Have concrete material available if needed for students to select (e.g., arrow cards, money in $10 notes and ones, and 100s boards).

Explicitly press for students to use place value language in their explanations.

Expect children to represent their reasoning on an empty number line and track the jumps in either 10's or bigger numbers. If the students do not use these introduce as a representation.

Sets of tens (and tens of tens) can be perceived as single entities e.g. 30 is 3 tens; When we add 40 we are adding 4 tens. Make explicit 30 + 10 is 3 tens plus 1 ten. This highlights the nested nature of place value. Nested place value is the idea that place value units are included in other place value units, for example, tens are within hundreds, and hundreds are within thousands.

Big Ideas

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.

Number operations and strategies to solve number operations can be recorded using words, numbers, diagrams, and symbols.

Curriculum Links

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70).

Identify the nearest ten to any whole number up to 100.

Shareback

Select student solution strategies that focus on the place value and what happens to the tens and ones. Use an empty number line to record adding in tens or larger numbers.

Reinforce the language and concepts of nested place value (e.g., Eighty is 8 tens and thirty is 3 tens and 8 tens subtract 3 tens is 5 tens which is 50).

Connect

Ask students to solve the following and use place value language to describe their solutions:

75 + 24 =

99 – 35 =

Suggested Learning Outcomes

Add and subtract groupings of tens.

Represent equations on an empty number line.

Use place value to solve addition/subtraction problems.

Independent Tasks

Solve the following problems:

56 – 30 =

56 – 35 =

40 + 23 =

45 + 23 =

77 – 60 =

77 – 61 =

65 + 4 =

65 + 24 =

What patterns do you notice?

Mathematical Language

Tens, ones, add, subtract

Anticipations

Solutions, Misconceptions

Task 6

Mikayla has 19 loom bands and makes another 7 loom bands. How many loom bands does Mikayla have?

Wiremu has 17 loom bands and makes another 19 loom bands. How many loom bands does Wiremu have?

Tim has 8 loom bands and makes another 15 loom bands. How many loom bands does Tim have?

Nevaeh has 15 loom bands and makes another 28 loom bands. How many loom bands does Nevaeh have?

Teacher Notes

Introduce each problem one at a time and give students an opportunity to solve it and share back before introducing the next problem.

Have concrete material available if needed for students to select (e.g., tens frames, counters, hundreds board).

Expect to students to draw/record their number sentences.

Notice if students see patterns in each set of problems.

Shareback

Select students to share who are using bridging to a decade or equivalence and compensation to solve the problem. Record this on the board. If no students are using bridging to a decade or equivalence and compensation, then model as another way the teacher has seen used previously.

Bridging to a decade
19 + 1 = 20
20 + 6 = 26

Equivalence and compensation
(19 + 1) + 7 = 27
27 – 1 = 26

Big Ideas

Numbers are used to name specific quantities. Numbers can be decomposed into parts in an infinite number of ways without the quantity changing.

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.

Equations show relationships of equality between parts on either side of the equal sign. The properties of equality are: If the same real number is added or subtracted to both sides of an equation, equality is maintained; If both sides of an equation are multiplied or divided by the same real number (not dividing by 0), equality is maintained; Two quantities equal to the same third quantity are equal to each other.

Connect

Ask students to describe how you would solve the following problems using bridging to a decade or equivalence and compensation:

29 + 16 =

18 + 39 =

Represent using an empty number line and equations.

Suggested Learning Outcomes

Use counting on to solve addition problems.

Use bridging decades to solve addition problems.

Use equivalence and compensation to solve addition problems.

Represent and explain thinking using pictures, numbers, and symbols.

Independent Tasks

Mikayla has 12 loom bands and makes another 9 loom bands. How many loom bands does Mikayla have?

Wiremu has 19 loom bands and makes another 12 loom bands. How many loom bands does Wiremu have?

Tim has 13 loom bands and makes another 8 loom bands. How many loom bands does Tim have?

Nevaeh has 18 loom bands and makes another 13 loom bands. How many loom bands does Nevaeh have?

14 + 8 =

18 + 14 =

8 + 19 =

19 + 18 =

Curriculum Links

Identify, read, and write whole numbers up to at least 100, and represent them using base 10 structure.

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70).

Identify the nearest ten to any whole number up to 100.

Add and subtract numbers up to 100 without renaming (e.g., 53 + 21, 55 – 32).

Mathematical Language

Add

Anticipations

Solutions, Misconceptions

Task 7

Marlon has 17 Pokemon cards. He gives his friend 8 cards. How many cards does he have now?

Nita has 27 Pokemon cards. She gives her friend 8 cards. How many cards does she have now?

Tere has 27 Pokemon cards. He gives his friend 18 cards. How many cards does he have now?

Tevita has 24 Pokemon cards. He gives his friend 15 cards. How many cards does he have now?

Sara has 44 Pokemon cards. She gives her friend 25 cards. How many cards does she have now?

Teacher Notes

Introduce each problem one at a time and give students an opportunity to solve it and share back before introducing the next problem.

Have concrete material available if needed for students to select (e.g., tens frames, counters, hundreds board).

Expect to students to draw/record their number sentences. Model how to represent this on an empty number line.

Notice if students use patterns to help them solve the problems.

Shareback

Notice and select student solution strategies where they have subtracted by bridging decades or used equivalence and compensation. Represent these using equations and with tens frames.

<u>Bridging decades</u>
17 – 8 =
17 – 7 = 10
10 – 1 = 9

<u>Equivalence and compensation</u>
17 – 8 =
17 – 10 = 7
7 + 2 = 9

If no students are using bridging to decades or equivalence and compensation, then model as another way a student has used previously.

Big Ideas

Numbers are used to name specific quantities. Numbers can be decomposed into parts in an infinite number of ways without the quantity changing.

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.

Equations show relationships of equality between parts on either side of the equal sign. The properties of equality are: If the same real number is added or subtracted to both sides of an equation, equality is maintained; If both sides of an equation are multiplied or divided by the same real number (not dividing by 0), equality is maintained; Two quantities equal to the same third quantity are equal to each other.

Connect

Ask students to describe how you would solve the following problems using bridging to decades and/or equivalence and compensation:

35 – 16 =

44 – 29 =

Suggested Learning Outcomes

Use bridging decades to solve subtraction problems.

Use equivalence and compensation to solve subtraction.

Explain and represent solution strategies using materials, words, pictures, empty number lines and symbols.

Independent Tasks

Marlon has 16 Pokemon cards. He gives his friend 7 cards. How many cards does he have now?

Nita has 26 Pokemon cards. She gives her friend 17 cards. How many cards does she have now?

Tevita has 24 Pokemon cards. He gives his friend 15 cards. How many cards does he have now?

Sara has 44 Pokemon cards. She gives her friend 25 cards. How many cards does she have now?

15 – 6 =
25 – 16 =
26 – 17 =
46 – 17 =

Curriculum Links

Identify, read, and write whole numbers up to at least 100, and represent them using base 10 structure.

Partition and regroup whole numbers up to at least 100, using a systematic approach and noticing patterns (e.g., 10 + _ = 70, 20 + _ = 70, 30 + _ = 70).

Identify the nearest ten to any whole number up to 100.

Add and subtract numbers up to 100 without renaming (e.g., 53 + 21, 55 – 32).

Mathematical Language

Tens, ones, add, subtract.

Anticipations

Solutions, Misconceptions

Task 8

Work with your partner to work out which number sentences are true or false.

99 = 102

14 + 9 = 23 + 6

25 = 12 + 13

16 + 18 = 15 + 19

13 – 8 = 14 – 9

24 – 16 = 24 – 16

1002 = 1002

Explain why you think the number sentences are true or false.

Teacher Notes

Ensure that students understand what true and false means. Introduce notation of not equal (≠) for the number sentences that they think are false.

Students may begin by demonstrating misconceptions (14 + 9 = 23 + 6 is true because 14 + 9 = 23). This can be used to position students to agree/disagree.

Teacher to notice students who are able to accept the use of the equals sign to show balance/relationship.

Use arrows and notation to show relationships on the equations to the students.

Shareback

Allow students to share misconceptions related to the equal sign to position them to engage in argumentation.

Select students to share who have used patterns and relationships to recognise equivalence.

Connect

Ask students to write their own true and false number sentences.

Note students who use the equal sign flexibly.

Big Ideas

Equations show relationships of equality between parts on either side of the equal sign. The properties of equality are: If the same real number is added or subtracted to both sides of an equation, equality is maintained; If both sides of an equation are multiplied or divided by the same real number (not dividing by 0), equality is maintained; Two quantities equal to the same third quantity are equal to each other.

Curriculum Links

Solve true or false number sentences and open number sentences involving addition and subtraction of one- and two-digit numbers, using an understanding of the equal sign (e.g., 18 + _ = 17 + 6, 17 = 25 (T or F?).

Suggested Learning Outcomes

Explain and justify relationships between numbers in an equation.

Write statements of equivalence in words and using notation.

Solve equivalence problems and explain and justify the solutions.

Independent Tasks

- Write your own set of true and false number sentences.
- Give your true and false number sentences to your classmates to solve.
- Make sure you ask them to explain and justify why they think they are true or false and see if you agree!

Mathematical Language

Equal sign, relationship, same, different.

Anticipations

Solutions, Misconceptions

Task 9

Can you find the missing numbers?

17 + 6 = _ + 5

24 + 19 = 26 + _

16 + _ = 17 + 28

_ + 37 = 56 + 39

Teacher Notes

Students may begin by demonstrating misconceptions. This can be used to position students to agree/disagree.

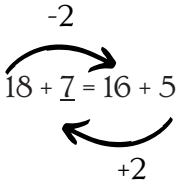
Some students may work out one side and then the other to equal the same number. However, the key focus should be on positioning students to use the relationships across the equal sign.

Draw attention to students who use relational types of thinking and notate the number sentences with arrows to highlight this (shown above).

Shareback

Allow students to share misconceptions related to the equal sign (e.g., 17 + 6 = 23 + 5) to position them to engage in argumentation.

Select students to share who have used a relational strategy to find the missing number. If no students use a relational strategy, introduce this to them using arrows and explanations.



Connect

Ask the students to find the missing numbers by looking for the relationship across the equal sign and show this using arrows.

68 + 37 = _ + 39

_ + 118 = 125 + 119

Big Ideas

Equations show relationships of equality between parts on either side of the equal sign. The properties of equality are: If the same real number is added or subtracted to both sides of an equation, equality is maintained; If both sides of an equation are multiplied or divided by the same real number (not dividing by 0), equality is maintained; Two quantities equal to the same third quantity are equal to each other.

Curriculum Links

Solve true or false number sentences and open number sentences involving addition and subtraction of one- and two-digit numbers, using an understanding of the equal sign (e.g., 18 + _ = 17 + 6, 17 = 25 (T or F?).

Suggested Learning Outcomes

Explain and justify relationships between numbers in an equation.

Write statements of equivalence in words and using notation.

Solve equivalence problems and explain and justify the solutions.

Independent Tasks

Find the missing number

33 + 9 = _ + 8

45 + 17 = 46 + _

_ + 26 = 57 + 28

117 + _ = 127 + 16

Mathematical Language

Equal sign, relationship, same, difference, add, subtract.

Anticipations

Solutions, Misconceptions

Task 10

Can you find the missing numbers?

13 – 8 = _ – 7

21 – 17 = 20 – _

23 – _ = 24 – 6

_ – 38 = 62 – 39

Teacher Notes

Present each number sentence one by one and ask students to share back before introducing the next one.

Students may begin by demonstrating misconceptions. This can be used to position students to agree/disagree.

Note that the order of directionality is different between addition and subtraction and students may adjust as you do with addition and end up with an incorrect solution such as 13 – 8 = 14 – 7. Facilitate a discussion with the students to notice the difference between open number sentences with addition and subtraction (e.g., addition involves an adjustment of +1, -1 while subtraction involves an adjustment of +1, +1, or -1, -1).

Some students may work out one side and then the other to equal the same number. However, the key focus should be on positioning students to use the relationships across the equal sign.

Draw attention to students who use relational types of thinking and notate the number sentences with arrows to highlight this.

Shareback

Select students to share who have used a relational strategy to find the missing number. If no students use a relational strategy, introduce this again using arrows and explanations.

Big Ideas

Equations show relationships of equality between parts on either side of the equal sign. The properties of equality are: If the same real number is added or subtracted to both sides of an equation, equality is maintained; If both sides of an equation are multiplied or divided by the same real number (not dividing by 0), equality is maintained; Two quantities equal to the same third quantity are equal to each other.

Curriculum Links

Solve true or false number sentences and open number sentences involving addition and subtraction of one- and two-digit numbers, using an understanding of the equal sign (e.g., 18 + _ = 17 + 6, 17 = 25 (T or F?).

Connect

Ask the students to find the missing numbers by looking for the relationship across the equal sign and show this using arrows.

33 – 18 = _ – 19

44 – _ = 42 – 27

Suggested Learning Outcomes

Make and identify groupings for numbers from 0-10.

Represent, explain, and justify number groupings between 0-10 using pictures, numbers, and words.

Independent Tasks

Find the missing numbers:

12 – 5 = 10 – _

25 – 17 = _ – 19

34 – _ = 35 – 27

_ – 25 = 51 – 15

Mathematical Language

Equal sign, relationship, same, different.

Anticipations

Solutions, Misconceptions

Task 11

Open your money box and check how much money you have.

Sort the money into groups with the same value coins and notes.

Record the total amount for each group.

Add the groups together to work out how much money there is altogether.

Teacher Notes

Before you launch the task, ask the students to identify coins and notes up to $20. Introduce the idea that you can use coins to make a dollar. Role play making $1 from ten 10 cent pieces and swapping this for a $1 coin.

Give each pair of students a set of money in different denominations between 10 cents to $20. Make sure that the totals are less than 100.

Expect the students to first group the different denominations and then add together the group and record the total for the group. Support students to add the different groups together.
Facilitate students to notice that the coins will make dollars when they reach 100.

For the independent task, have sets of play money available with coins and notes from 10 cents to $20.

Shareback

Select student solution strategies where they have grouped the different denominations together and then systematically added the total amount by recording each amount and adding it.

Big Ideas

Numbers are used to name specific quantities. Numbers can be decomposed into parts in an infinite number of ways without the quantity changing.

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.

Curriculum Links

Recognise and order New Zealand denominations up to $20 according to their value, make groups of 'like' denominations, and calculate their value.

Connect

Ask students to identify the following:

How many 10 cent coins make one dollar?

How many 20 cent coins make one dollar?

How many 50 cent coins make one dollar?

How many $1 coins make a 5 dollar note?

How many $2 coins make a 10 dollar note?

Suggested Learning Outcomes

Recognise New Zealand denominations up to $20.

Make groups of the same denomination.

Add and subtract groupings of money.

Independent Tasks

Open your money box and check how much money you have.

Sort the money into groups with the same value coins and notes.

Record the total amount for each group.

Add the groups together to work out how much money there is altogether.

Mathematical Language

Dollars, cents, coins, notes.

Anticipations

Solutions, Misconceptions

Task 12

Mere's teacher asked her to solve 18 + 7 = ?

Mere adds the two numbers and writes 18 + 7 = 25.

The teacher then asks her to solve 25 – 18 =?

Mere says she already knows the answer.

a) How does she know?
b) Do you think this will work for all numbers? If so, how do you know?
c) Can you write your own examples with other numbers where this relationship works?

Teacher Notes

Students may compute each sum separately or draw on the inverse relationship between addition and subtraction. Draw student attention to those who draw on the inverse relationship. Allow students opportunities to explore inverse relationships.

Push students to generalise by finding their own equations.
Encourage students to prove and justify why the inverse relationship is true.

A quasi-variable is a large number that can represent any number. Students do not need to solve these examples, rather they look at the relationships and use that to explain what they notice/ what is happening mathematically.

Shareback

Select students who use the inverse relationship rather than calculating. Highlight to the students that you do not need to calculate but can use the relationship to solve different equations. Ask students to consider whether this will always work and when it will not work.

For example:

5 + 8 = 13

8 – 5 ≠ 3

Big Ideas

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.

Curriculum Links

Recall addition facts up to 10, and explore addition facts up to 20 and their corresponding subtraction facts (families of facts), including doubles and halves.

Connect

Use quasi-variables to press the students to generalise the relationship.

If 71 – 56 = 15

What other number sentences can you write using the same numbers?

Suggested Learning Outcomes

Explain and show how patterns and relationships help solve equations.

Explain and justify the inverse relationship of addition and subtraction.

Independent Tasks

Solve these number sentences but look for any patterns or relationships that will help you solve them.

18 + 5 =	45 - 8 =	16 + 17 =
8 + 37 =	17 + 16 =	45 - 37 =
33 - 17 =	23 - 5 =	23 - 18 =
5 + 18 =	33 - 16 =	8 + 35 =

What patterns and relationships did you notice?

Mathematical Language

Conjecture, inverse relationship, generalisation, addition, subtraction.

Anticipations

Solutions, Misconceptions

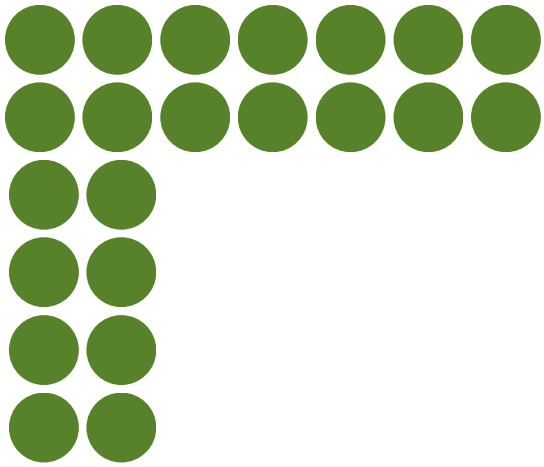
Assessment Task 1 - Number - Year 2

Tane is collecting shells. He has 16 shells and picks up another 19 shells. How many does he have altogether? Prove and justify your answer.

Lana has 24 stickers in her collection. She gives 18 stickers to her younger brother. How many stickers does Lana have now? Prove and justify your answer.

Write one or more word problems for a friend involving addition or subtraction. Show how you would solve it.

Assessment Task 2 - Number - Year 2



Write number sentences about the dots above.
Describe what patterns you can find.
Why do your patterns work?
Do they work with other numbers?

Assessment Task 3 - Number - Year 2

13 + 18 = 19 + 5 = 5 + 5 + 5 = 18 + 13 =

3 + 3 + 8 = 5 x 3 = 24 – 19 =

24 – 5 = 3 x 5 = 5 + 19 = 6 + 8 =

Look at the number sentences above.

- Describe what patterns you can find.
- Why do your patterns work?
- Do they work with other numbers?