HANGAIA TE URUPOUNAMU MŌ TĀTOU

Taumata 3 (Tau 5-6)
Tau me te Taurangi

Teacher Booklet
ODD YEARS

Rapanga 1	I tētahi hui i tae mai tētahi ope nui rawa. 275 ngā tangata i tae mai engari 139 anake i kai i te wharekai. Nareira tokohia ngā tangata kare i kai? I tētahi hui i tae mai 1437 ngā tangata engari 268 anake i kai i te wharekai. Nareira tokohia ngā tangata kare i kai?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-4:** Know how many tenths, tens, hundreds, and thousands are in whole numbers. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA3-7:** Generalise the properties of addition and subtraction with whole numbers
Whāinga Ako ***Learning Outcomes***	Explain the face, place, and total value of the digits in numbers. Explain and justify the use of place value to solve subtraction problems. Explain and justify the use of equivalence and compensation to solve subtraction problems. Use and justify the inverse relationship between addition and subtraction to solve problems. Represent equations on an empty number line, in notation and using a place value house.
Reo Matatini Pāngarau ***Mathematical Language***	Ones, tens, hundreds, thousands, add, subtract, place value, face value, total value, digit, addition, subtraction, inverse relationship.

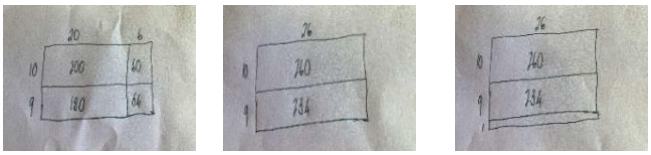
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies that have used inverse relationships of addition and subtraction, equivalence and compensation or place value and renaming. *Inverse relationship* 275 – 139 = 139 + __ = 275 *Equivalence and compensation* 275 – 139 = 275 – 140 = 135 135 + 1 = 136 *Place value and renaming* 275 – 139 = 5 – 9 = ? *Rename one ten so 15 ones – 9 ones = 6* 60 – 30 = 30 200 – 100 = 100 100 + 30 + 6 = 136 **Connect:** Ask students to solve the following equations and describe any patterns they notice: 200 – 38 = 2000 – 338 = 20000 – 3338 =
Kōrero Tautoko ***Teacher Notes***	• Before you launch the task, write 5781 on the board. • Ask students, what is this number? How can you write and explain this number in different ways? Support the students to read the number correctly. Give them an opportunity to work in pairs and record and represent their reasoning. Explore concepts of place, face, and total value. Support students to discuss thousands, hundreds, tens, ones and make links to place, face, and total value. Introduce a place value house as a representation and have this on the wall or whiteboard for students to refer to. Repeat this as a warm-up throughout the year and increase the numbers up to 1 000 000. • Notice use of place value and the ability to see hundreds as ten tens and tens as ten ones. Draw connections to represent these within place value houses. • Introduce empty number line as a way to represent solution strategies. Expect students to use equations to represent their thinking.

Ngohe whakaharatau ***Independent Tasks***	Use a place value house and solve the following equations: 157 + 742 = 461 + 428 = 534 + 2564 = 1439 + 361 = 5528 + 1492 = What do you notice? Justify your thinking.
Ngā matapae ***Anticipations***	

Rapanga 2	I kohi pūtea tētahi kura kia haere ki Rarotonga. I tētahi wīkena i whakatū tētahi mākete,ā, i kohi 5432 taara engari i te tīmata o te wīkena 3789 taara tā rātou. Nareira e hia te moni i kohia e rātou? I kohi pūtea tētahi kura kia haere ki Rarotonga. I tētahi wīkena i whakatū tētahi mākete,ā, i kohi 6534 taara engari i te tīmata o te wīkena 3785 taara tā rātou. Nareira e hia te moni i kohia e rātou?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-4:** Know how many tenths, tens, hundreds, and thousands are in whole numbers. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA3-7:** Generalise the properties of addition and subtraction with whole numbers
Whāinga Ako ***Learning Outcomes***	Explain the face, place, and total value of the digits in numbers. Explain and justify the use of place value to solve subtraction problems. Explain and justify the use of equivalence and compensation to solve subtraction problems. Use and justify the inverse relationship between addition and subtraction to solve problems. Represent equations on an empty number line, in notation and using a place value house.
Reo Matatini Pāngarau ***Mathematical Language***	Ones, tens, hundreds, thousands, add, subtract, place value, face value, total value, digit, addition, subtraction, inverse relationship.

Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies that have used inverse relationships of addition and subtraction, equivalence and compensation or place value and renaming. **Connect:** Ask students to describe what they notice is similar and different in the student solution strategies. Will the solution strategy always work?
Kōrero Tautoko ***Teacher Notes***	• Notice use of place value and the ability to see hundreds as ten tens and tens as ten ones. Draw connections to represent these within the place value houses. • Expect students to use equations and the empty number line to represent their thinking. • If students use the standard algorithm, ensure procedural and conceptual understanding, e.g., can they explain this in a sense-making way referring to place value and renaming.
Ngohe whakaharatau ***Independent Tasks***	Solve the following equations: 531 – 249 = 735 – ☐ = 326 ☐ – 432 = 278 4321 – 1795 =
Ngā matapae ***Anticipations***	

Rapanga 3	Kei te awhi a Merenia i tōna whanau ki te kohikohi tīhate. 16 ngā tī hate ki ia pouaka. 24 ngā pouaka. E hia ngā tīhate katoa? Kei te awhi a Merenia i tōna whanau ki te kohikohi tīhate. 18 ngā tī hate ki ia pouaka. 29 ngā pouaka. E hia ngā tīhate katoa?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-4:** Know how many tenths, tens, hundreds, and thousands are in whole numbers. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the use of the distributive property in multiplication. Explain and justify the use of equivalence and compensation in multiplication. Represent reasoning using different forms of notation including an area and an array model.

Reo Matatini Pāngarau ***Mathematical Language***	Distributive property, area, equivalence, compensation, factor, product.
Tohatoha Whakaaro/ Wā Hononga ***Sharing back/ Connect***	Select student solution strategies which use the distributive property or equivalence and compensation. *Distributive property* $16 \times 24 = (10 \times 24) + (6 \times 24)$ $16 \times 24 = (10 \times 20) + (10 \times 4) + (6 \times 20) + (6 \times 4)$ *Equivalence and compensation* $16 \times 24 = (20 \times 24) – (4 \times 24)$ If either solution strategy has not been used, introduce this as a solution strategy that students have used previously. Record these as equations and model representing these using the area model.  **Connect:** Ask students to describe how you would solve the following equation using either the distributive property or equivalence and compensation and represent it using the area model: $38 \times 45 =$
Kōrero Tautoko ***Teacher Notes***	• Notice student solution strategies either using distributive property or equivalence and compensation. Explicitly talk about the type of mathematical property they have used and use correct mathematical language. • Introduce students to representations using array/area model. • Expect students to record their solutions using equations.
Ngohe whakaharatau ***Independent Tasks***	Solve the following equations: $24 \times 18 =$ $29 \times 45 =$ $48 \times 32 =$ Represent your solution strategy using equations and an area model.

Ngā matapae ***Anticipations***	

Rapanga 4	I tētahi tauranga waka 288 ngā āputa motoka ki ia puroa. 32 ngā puroa. E hia ngā waka e āhei ana te whakakī I te tauranga waka?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-4:** Know how many tenths, tens, hundreds, and thousands are in whole numbers. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the use of the distributive property in multiplication. Explain and justify the use of the associative property in multiplication. Represent reasoning using different forms of notation including an area and an array model.
Reo Matatini Pāngarau ***Mathematical Language***	Distributive property, area, associative property, factor, product.

Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select and sequence student solution strategies that use the distributive property or associative property. *Associative property* 288 × 32 = (288 × 3 × 10) + (288 × 2) If either solution strategy has not been used, introduce this as a solution strategy that students have used previously. **Connect:** Ask students to describe how the associative property would be used if multiplying by 50 or 80. Ask students to describe how the equation below could be solved by using either the distributive and/or associative property: 348 x 151 = Model links to standard written algorithm for multiplication (if appropriate).
Kōrero Tautoko ***Teacher Notes***	• Expect students to record using equations and the area model. • Notice students' solution strategies using the distributive property or the associative property. • Explore what happens when using the associative property. • If students use the standard algorithm, links could be made between this and the distributive property.
Ngohe whakaharatau ***Independent Tasks***	Solve the following equations: 55 x 47 = 32 x 67 = 157 x 62 = What patterns did you notice and use to help you solve the equations? Would the patterns work for any numbers when multiplying?
Ngā matapae ***Anticipations***	

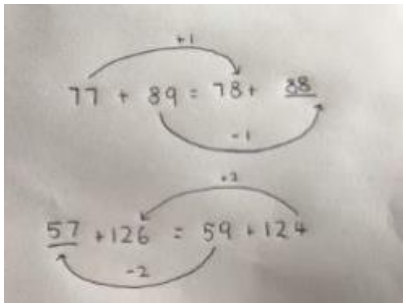
Rapanga 5	He maha ngā tīhate tā Hone ki te hoko (sell) i te mākete. I te mutunga o tētahi mārama i kohi $390. Mēnā ka hoko tētahi tīhate $16 te utu, e hia ngā tīhate kua hokona e Hone,ā, he aha tana putea i te timata o te mārama? He aha ētahi atu kautenga e taea ana e Hone te kohi? Whakamāramahia te tauira me ngā taunakitanga. He aha tētahi ture, tētahi tauira ahakoa te kautenga o ngā tihate?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the use of the partial quotients/distributive property in division. Explain and represent the inverse relationship of multiplication and division. Represent reasoning using different forms of notation.
Reo Matatini Pāngarau ***Mathematical Language***	Distributive property, inverse relationship, factor, product, quotient, divisor, dividend

Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies where they have used the inverse relationship of multiplication and division or the partial quotient/distributive property in the solution. If either solution strategy has not been used, introduce this as a solution strategy that students have used previously. *Inverse relationship* 390 ÷ 16 = 16 × ? = 390 16 × 10 = 160 16 × 20 = 320 … *Distributive property/partial quotients* 390 ÷ 16 = (160 ÷ 16) + (160 ÷ 16) + (64 ÷ 16) **Connect:** Ask students to describe how you would solve the following equation using either the inverse relationship or the partial quotient/distributive property: 567 ÷ 26 =
Kōrero Tautoko ***Teacher Notes***	• Select strategies that start at use of some form of multiplicative thinking. • If addition or subtraction used have students rework as multiplication or division. • Notice whether students draw on multiplying by ten when using the inverse relationship. Model use of x 10 then x 5 as an easy process. • Notice whether students have used partial quotients • Note use of doubling and shift towards concept of multiplying by two as doubling.
Ngohe whakaharatau ***Independent Tasks***	Solve the following equations: 646 ÷ 21 = 781 ÷ 34 = 965 ÷ 46 =
Ngā matapae ***Anticipations***	

Rapanga 6	Kei te haere tētahi kura I tētahi haerenga mā runga pahi. 38 ngā tangata ki ia pahi. 893 ngā tangata katoa. E hia ngā pahi? He aha te tau ka whakamahia kia pai ai tāu rautaki ki te whakakī ngā pahi katoa i te tangata? Kia rite koutou ki te whakamārama ngā momo tauira e toru.
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the use of the partial quotients/distributive property in division. Explain and represent the inverse relationship of multiplication and division. Represent reasoning using different forms of notation.
Reo Matatini Pāngarau ***Mathematical Language***	Distributive property, inverse relationship, factor, product, quotient, divisor, dividend.

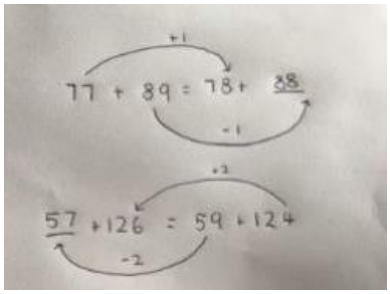
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies where they have used the partial quotient/distributive property in the solution. **Connect:** What numbers would you change these into when using partial quotient/distributive property to divide? 587 ÷ 24 = 783 ÷ 36 = 899 ÷ 41 = Have children discuss possible number combinations without solving these. Model links to the relationship between the partial quotients/distributive property and the standard division algorithm.
Kōrero Tautoko ***Teacher Notes***	• Notice students who are using addition or subtraction and support them to re-work as multiplicative thinking. • Notice students who use the inverse property or who are using partial quotients/distributive property in their calculations.
Ngohe whakaharatau ***Independent Tasks***	Solve the following equations: $486 \div 22 =$ $952 \div 38 =$ $898 \div 72 =$ $10 \div \frac{1}{2} =$ $10 \div \frac{1}{4} =$
Ngā matapae ***Anticipations***	

Rapanga 7	He mahi ā rōpū tēnei. Whakaoti ēnei whārite. Me maumahara ki te āta whakamārama ngā rautaki kia pai ai te tohaina ki ngā tamariki katoa. 14 + 9 =_ + 8 _ + 17 = 26 + 15 93 - _ = 83 - 37 235 - 46 = _ - 48 375 + 28 - _ = 377 54 + 4 + 5 = 56 + _
Whakaaro Matua Pāngarau ***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.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA3-7:** Generalise the properties of addition and subtraction with whole numbers
Whāinga Ako ***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.
Reo Matatini Pāngarau ***Mathematical Language***	Equivalent, equal sign.
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Allow students to share misconceptions related to the equal sign (e.g., 14 + 9 = 23 + 8) to position them to engage in argumentation. Select student solution strategies that use relational reasoning. 14 + 9 = 15 + 8 because 8 is one less than 9 so it has to be one more than 14.

	If no students use a relational strategy, model this to them using arrows and explanations.  **Connect:** Ask students to solve the following problems using a relational solution: 198 + 174 = __ + 184 372 – __ = 72 – 58 Support students to notice the variation in directionality between addition equivalence problems (+1, -1) and subtraction equivalence problems (-300, -300).
Kōrero Tautoko ***Teacher Note• s***	• Before you launch the task, ask the students to discuss these true and false number sentences and justify their thinking. Ensure that students understand what true and false means. Introduce notation of not equal (≠) for the number sentences that they think are false: 265 = 263 77 + 286 = 286 + 77 56 + 39 = 54 + 37 52 = 40 + 12 54 – 5 = 49 – 7 63 – 18 = 61 – 16 • Use true and false and open number sentence tasks as a warm up throughout the year. • Students may initially treat the equals sign as an operator or indication to write the answer next. • Students also may compute each side to work out whether they are equal. • Notice students who use the relationships across the equals sign to see whether there is balance. • Highlight to the students to look across the equals sign and find the relationships between numbers to the left and the numbers on the right. • Notice students who use the relationships across the equals sign to see whether there is balance. • Press for use of arrows and notations to highlight the relationships.

Ngohe whakaharatau ***Independent Tasks***	Solve these equations: 27 + 16 = 29 + __ 51 – __ = 61 – 37 __ + 137 = 274 + 139 145 – 69 = __ – 68 363 + 78 – __ = 365 85 + 7 + 2 = 85 + __
Ngā matapae ***Anticipations***	

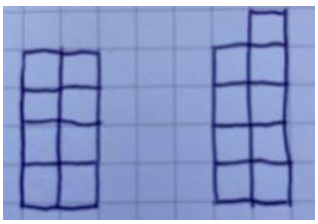
Rapanga 8 (Whole Class Option)	Whiriwhirihia ko ehea ngā wharite tika me ngā wharite hē. Me whakaae mai te rōpū katoa. 536 + 618 = 436 + 718 8 + 8 + 376 = 376 + 16 77 - 49 = 75 - 47 9 + 9 + (5 x 9) = (2 x 9) + (5 x 9) 16 x 8 = (16 x 10) - 16 9 + 10 + 11 + 12 = 13 + 14 + 15
Whakaaro Matua Pāngarau ***Big 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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA3-7:** Generalise the properties of addition and subtraction with whole numbers **NA4-1**: Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***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.
Reo Matatini Pāngarau ***Mathematical***	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.

Language	
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies that use relational reasoning. *77 – 49 = 75 – 47 is true because 75 is two less than 77 and 47 is two less than 49.* If students do not use a relational strategy, model this to them using arrows and explanations.  **Connect:** Is the number that goes in the __, the same number in both of these equations? 2 × __ + 15 = 31 2 × __ + 15 – 9 = 31 – 9 Explain why or why not.
Kōrero Tautoko ***Teacher Notes***	● Remind students of the notation of not equal (≠) for the number sentences that they think are false. ● Students may initially treat the equals sign as an operator or indication to write the answer next. These misconceptions can be used to position students to engage in mathematical argumentation. ● Students also may compute each side to work out whether they are equal. However, work with them to facilitate them to notice that you can use the relationships across the equals sign to see whether there is balance. ● Highlight the students' relational responses (e.g., noticing the + 2, – 2 relationships). ● Press for use of arrows and notations to highlight the relationships. ● For the independent task, have cards or strips of paper ready for students to write on and create a space called the true and false number sentence wall.

Ngohe whakaharatau ***Independent Tasks***	Explain and justify which number sentences are true and false: 55 = 49 + 5 + 2 29 + 34 = 27 + 32 314 – 148 = 214 – 48 32 – 15 = 34 – 13 42 – 13 = 29 – 9 15 + 6 + 77 = 4 + 17 + 67 Write your own true and false number sentences.
Ngā matapae ***Anticipations***	

Rapanga 9 (Whole Class Option)	Ka whakaoti a Tania i 98 x 56 = 548 Ka pātai tana kaiako ki a ia ki te whakaoti ēnei whārite: 56 x 98 = 5488 ÷ 56 = 5488 ÷ 98 = I āta titiro a Tani ki ngā whārite me tana whakapae "ka mōhio au ki te whakautu ēnei, kare he take mo te rautaki. He aha ngā tauira i kite a Tania? Ka tika ēnei tauira i ngā wā katoa? Tuhia au ake wharite e whakamahia ana i tēnei tauira
Whakaaro Matua Pāngarau ***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.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the distributive property of multiplication. Use different representations to justify.
Reo Matatini Pāngarau ***Mathematical Language***	Inverse relationship, commutative, equivalence, conjecture, generalisation.
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select students who have used the inverse relationship between multiplication and division and can explain this relationship to work out the number sentences. Support students to explain how this relationship applies to multiplication and division with any numbers or addition and subtraction. **Generalise:** Can you write a range of number sentences that would match the following number sentences using if and then:

	If $1260 \div 28 = 45$ then … If $g \times h = p$ then …
Kōrero Tautoko ***Teacher Notes***	Students may focus on finding the answers for each number sentence. Position them instead to recognise the inverse relationship between multiplication and division instead of calculating the answers. • For the independent activity, have appropriate equipment for students to build concrete models to prove their conjectures (e.g., counters, grid paper, peg boards).
Ngohe whakaharatau ***Independent Tasks***	John said "When you are multiplying two numbers together it doesn't matter which order you multiply them in, the product will be the same". Do you agree or disagree with John's conjecture. Does this work for all numbers? Does it work for addition, subtraction, and division? Use the material to build a model to prove John's conjecture.
Ngā matapae ***Anticipations***	

Rapanga 10 (Whole Class Option)	He taukehe, he taurua kei roto I ēnei whārite. 5 + 4 = 9 42 + 6 = 48 13 + 5 = 18 16 - 2 = 14 17 - 3 = 14 16 - 5 = 11 17 - 4 = 13 He aha ngā tauira i puta mai ana i nga whārite tāpiri me ngā whārite tango o ngā taukehe me ngā taurua?
Whakaaro Matua Pāngarau ***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. Relationships can be described and generalisations made for mathematical situations that have numbers or objects that repeat or grow in predictable ways
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA3-7:** Generalise the properties of addition and subtraction with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain the structure of odd and even numbers. Develop definitions of odd and even numbers. Use concrete material to justify conjectures about adding and subtracting odd and even numbers.
Reo Matatini Pāngarau ***Mathematical Language***	Odd numbers, even numbers, generalisation, patterns
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies that use a concrete model that draws on the structure and definition of an odd or even number.  Model of even and odd numbers **Connect:** Ask students to represent their conjecture in words and a diagram (or physical model). Ask students to use their conjectures and models to see

	whether the following answers would be odd or even: 287 + 598 = 1393 – 448 = 1191 + 223 957 = 26878 – 23454 = Support students to notice that the final digit determines the oddness or evenness of the number and highlight this to all students.
Kōrero Tautoko ***Teacher Notes***	• Have available to use: grid paper, multi-link cubes, counters, peg-boards, and ice block sticks. • Begin by asking students to share everything that they know about odd and even numbers. Record all of the statements on the board. Ask the students to use different types of the concrete material to construct models of odd and even numbers to support them to begin thinking about the structure of the numbers and whether their statements are true. • Support students to develop correct mathematical definitions (e.g., an even number can be divided by two and you will end up with the same whole number in both groups. When you divide an odd number by two you end up with one left over. • For the independent task, have available counters, array cards or strips, grid paper, and multi-link cubes.
Ngohe whakaharatau ***Independent Tasks***	Mata is solving some true and false number sentences and notices some patterns. 25 x 6 = 25 + 25 + 25 + 25 + 25 + 25 19 + 19 + 19 = 2 x 19 4 x 17 = 17 + 17 + 17 + 17 Which do you think are true and false? What do you notice? Can you write more examples of this pattern and use equipment to prove that it works? Make a conjecture and represent this in words, using a physical diagram and with variables.

Ngā matapae ***Anticipations***	

Rapanga 11 (Optional task)	2683 ngā pukapuka i te Whare Pukapuka. 128 ngā pukapuka ki ia pouaka. E hia ngā pouaka ka hiahia te kaiwhare pukapuka ki te whakakī i ngā pukapuka?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1:** Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the use of the partial quotients/distributive property in division. Explain and represent the inverse relationship of multiplication and division. Represent reasoning using different forms of notation.
Reo Matatini Pāngarau ***Mathematical Language***	Distributive property, inverse relationship, factor, product, quotient, divisor, dividend
Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies where they have used the inverse relationship in the solution. **Connect:** Ask students to estimate the answers to the questions below by using the inverse relationship of multiplication and division and discuss what they would multiply by: 8899 ÷ 4431 = 9675 ÷ 3151 =

Kōrero Tautoko ***Teacher Notes***	• Notice students using the inverse relationship. Support them to notice the efficiency of multiplication by 10. • Expect students to represent using equations.
Ngohe whakaharatau ***Independent Tasks***	Solve the following equations: $896 \div 231 =$ $9095 \div 3035 =$ $8436 \div 222 =$ $\frac{1}{2} \div \frac{1}{3} =$
Ngā matapae ***Anticipations***	

Rapanga 12 (Optional task)	Whakaoti ēnei: 64 x 39 = 32 x 585 = 797 x 459 = He aha ngā tauira e puta mai ana? He aha ngā momo rautaki kua whakamahia?
Whakaaro Matua Pāngarau ***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. 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. Patterns and relationships can be used, represented, and generalised in a variety of ways.
Hononga Marautanga ***Curriculum Links***	**NA3-1**: Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages. **NA3-2:** Know basic multiplication and division facts. **NA3-4:** Know how many tenths, tens, hundreds, and thousands are whole numbers. **NA3-6:** Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality. **NA4-1:** Use a range of multiplicative strategies when operating on whole numbers. **NA4-8:** Generalise properties of multiplication and division with whole numbers.
Whāinga Ako ***Learning Outcomes***	Explain and justify the use of the distributive property in multiplication. Explain and justify the use of equivalence and compensation in multiplication. Represent reasoning using different forms of notation including an area and an array model.
Reo Matatini Pāngarau ***Mathematical Language***	Distributive property, area, equivalence, compensation, factor, product

Tohatoha Whakaaro/Wā Hononga ***Sharing back/ Connect***	Select student solution strategies which use the distributive property or equivalence and compensation. **Connect:** Ask students to describe the properties or rules related to multiplication that they used to solve the tasks.
Kōrero Tautoko ***Teacher Notes***	• Notice student solution strategies either using distributive property or equivalence and compensation. Explicitly talk about the type of mathematical property they have used and use correct mathematical language. • Expect students to use representations using array/area model. • Expect students to record their solutions using equations.
Ngohe whakaharatau ***Independent Tasks***	Select one or more of the following assessment tasks (attached at the end of the document) as the independent activity: N1B: Addition and subtraction problems to solve. N1BC: Addition and subtraction problems to solve. N16B: Multiplication and division problems to solve. N16BC: Multiplication and division problems to solve. NA4: Properties of numbers and operations. NA4A: Properties of numbers and operations.
Ngā matapae ***Anticipations***	
