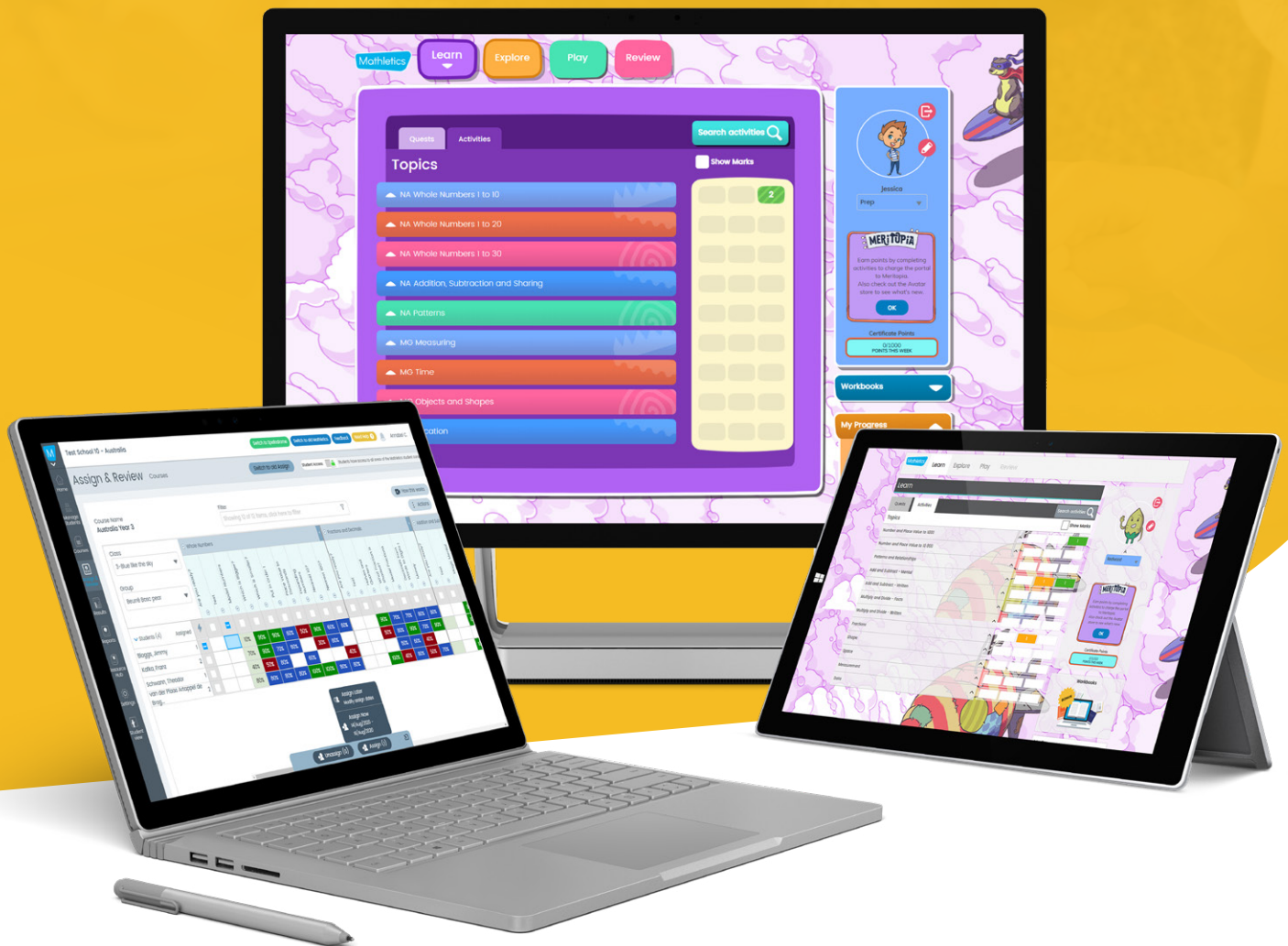# Mathletics
NWEA alignment
Understanding Practice and Fluency (UPF)

RIT SCORE BAND

Mathletics

NWEA alignment
RIT Score Band
Understanding Practice and Fluency (UPF)

Mathletics

Content

Thank you for using Mathletics.
We look forward to sharing the love of learning with your school.

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Represent and solve problems involving multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
3.OA.A.1 Interpret products of whole numbers.
Introducing multiplication	Multiplying using arrays and repeated addition	1	Introducing and describing arrays	• describe simple multiplication problems represented in arrays using '_ groups of _' and use 'rows' and 'columns' to describe the parts of the array • represent simple multiplication problems using arrays (concrete materials, pictures, or diagrams) • recognize and describe practical examples of arrays, e.g., seedling trays, seating arrangements
		2	Using repeated addition to multiply	• recognize and describe the relationship between, e.g., 3 groups of 4 as 4 + 4 + 4 • use empty number lines and number charts to help solve multiplication problems using repeated addition (2s, 5s, 10s, 3s, 4s) • explore the use of repeated addition to count in practical situations • apply known facts, such as doubles, to repeated addition problems, e.g., 5 + 5 + 5 + 5 as 10 + 10
		3	Connecting the multiplication symbol with arrays and repeated addition	• represent and solve simple multiplication problems represented in arrays by using repeated addition • describe using, e.g., '_groups of _ is the same as _ + _ + _' • connect the multiplication symbol with statements about groups of and repeated addition, e.g., 3 groups of 5 is 5 + 5 + 5 or 3 x 5 = 15
3.OA.A.2 Interpret whole-number quotients of whole numbers.
Introducing division	Dividing by sharing (up to 50)	1	Dividing by sharing (up to 50)	• model and solve division problems by equally sharing a collection into a given number of groups or number of columns/rows in an array • record answers to division problems using drawings, words, and numbers;- complete sentence stems e.g., 'when _ is shared into _ equal groups there are _ in each group' • describe any parts left over when the collection is not able to be equally shared
	Dividing by grouping (up to 50)	1	Dividing by grouping (up to 50)	• model and solve division problems sharing a collection of objects into groups of a given size, and by arranging it into rows or columns of a given size in an array, e.g., determine the number of columns in an array when 20 objects are arranged into rows of 4 • record answers to division problems using drawings, words, and numbers;- complete sentence stems, e.g., 'when _ is shared into _ equal groups there are _ in each group' • describe any parts left over when the collection is not able to be equally shared
	Create and solve problems involving equal groups	1	Creating and solving problems using grouping and sharing up to 5 x 5 (equal groups)	• create and solve problems in context using and grouping and sharing of equal groups • explain and compare methods of solving

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Represent and solve problems involving multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
3.OA.A.2 Interpret whole-number quotients of whole numbers.				
Introducing division	Using repeated subtraction to divide	1	Using repeated subtraction to divide	• solve division problems (group size known, number of groups unknown) using repeated subtraction and concrete materials, models, or drawings of groups or arrays • use an empty number line or number chart to represent division problems as repeated subtraction (group size known … number of groups unknown) • explore the use of repeated subtraction in practical situations
3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.				
Multiplication and division problems	Multiplication problems: fair share/equal grouping	1	Solving multiplication problems using fair shares or equal grouping (within 100)	• solve fair share multiplication or division problems (with unknown in any position), e.g., '20 flowers are to be placed in 4 bunches, how many flowers will be in each bunch?' • solve equal grouping multiplication or division problems (with unknown in any position), e.g., 'There are 9 tables in a cafeteria. Each table has 5 chairs. What is the total number of chairs in the cafeteria?' • write equations using a symbol, e.g., a box or a blank, to represent the unknown number • compare their own and others' methods of solution
	Multiplication/ division problems: arrays	1	Solving multiplication and division problems involving arrays (within 100)	• solve multiplication and division problems (with the unknown in any position) involving arrays, e.g., 'A rectangular egg carton has 3 rows and 4 columns of eggs. How many eggs are there?' • write equations using a symbol, e.g., a box or a blank, to represent the unknown number • compare their own and others' methods of solution
3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.				
Multiply/ divide: finding the unknown	Multiply/ divide: finding the unknown	1	Finding the unknown whole number (in any position) in a multiplication or division equation	• find the unknown whole number (in any position) in a multiplication or division equation

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking

Understand properties of multiplication and the relationship between multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
**3.OA.B.5 Apply properties of operations as strategies to multiply and divide.**				
Multiplication properties	Multiplication properties	1	Using the commutative property of multiplication up to 10 x 10	• use the commutative property of multiplication, e.g., 7 x 9 = 9 x 7
		2	Using the associative property of multiplication up to 10 x 10	• use the associative property of multiplication up to 10 x 10
		3	Using the distributive property up to 10 x 10	• use the distributive property up to 10 x 10
**3.OA.B.6 Understand division as an unknown-factor problem.**				
Division: unknown-factor problems	Understand division as an unknown-factor problem	1	Understanding division as an unknown-factor problem	• understand division as an unknown-factor problem

Multiply and divide within 100.

Quest	Learning Journey	Steps	Content	Detail
**3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.**				
Multiplication and division facts	Multiplication facts: 2, 4, 8	1	Recalling multiplication facts for 2	• recall the 2 multiplication facts
		2	Recalling multiplication facts for 4	• recall the multiplication facts for 4
		3	Recalling multiplication facts for 8	• recall the multiplication facts for 8
	Multiplication facts: 5, 10	1	Recalling multiplication facts for 5	• recall the 5 multiplication facts
		2	Recalling the multiplication facts for 10	• recall the 10 multiplication facts
	Multiplication facts: 3, 6, 9	1	Recalling multiplication facts for 3	• recall the multiplication facts for 3
		2	Recalling multiplication facts for 6	• recall the multiplication facts for 6
		3	Recalling multiplication facts for 9	• recall the multiplication facts for 9
	Multiplication facts: 7	1	Recalling multiplication facts for 7	• recall the multiplication facts for 7
	Recalling multiplication facts to 5 x 5	1	Recalling multiplication facts to 5 x 5	• recall multiplication facts to 5 x 5

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Multiply and divide within 100.

Quest	Learning Journey	Steps	Content	Detail
3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.				
Multiplication and division facts	Recalling multiplication facts to 10 x 10	1	Recalling multiplication facts up to 10 x 10 with automaticity	• recall facts in order • recall facts in random order • create a table or simple spreadsheet to record multiplication facts
	Division facts: 2, 4, 8	1	Recalling the division facts for 2	• recall the division facts for 2
		2	Recalling division facts for 4	• recall the division facts for 4
		3	Recalling division facts for 8	• recall the division facts for 8
	Division facts: 5, 10	1	Recalling the division facts for 5	• recall the division facts for 5
		2	Recalling the division facts for 10	• recall the division facts for 10
	Division facts: 3, 6, 9	1	Recalling the division facts for 3 up to 30	• recall the division facts for 3
		2	Recalling division facts for 6	• recall the division facts for 6
		3	Recalling division facts for 9	• recall the division facts for 9
	Division facts: 7	1	Recalling division facts for 7	• recall the division facts for 7

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Quest	Learning Journey	Steps	Content	Detail
3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.				
2-step word problems: 4 operations	2-step word problems with the 4 operations	1	Solving two-step word problems with the four operations (2, 5, 10 multiplication facts)	• use the four operations to solve two-step word problems • represent an unknown quantity with a letter • solve the problem using a variety of tools, models, and strategies

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Quest	Learning Journey	Steps	Content	Detail
3.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.				
Number patterns	Identifying and creating number patterns	1	Identifying and creating additive number patterns (3s, 4s, 6s, 7s, 8s, 9s, from any starting point within 100)	• identify additive number patterns, e.g., patterns that increase in 3s, 4s, 6s, 7s, 8s, and 9s from any starting point • describe the rule for an additive number pattern, e.g., 'It goes up by 3s' • continue and create an additive number pattern
		2	Identifying and creating subtractive number patterns (3s, 4s, 6s, 7s, 8s, 9s, from any starting point within 100)	• identify subtractive number patterns, e.g., patterns that decrease by 3s, 4s, 6s, 7s, 8s, and 9s from any starting point • describe the rule for a subtractive number pattern, e.g., 'It goes down by 3s' • continue and create a subtractive number pattern represented in numbers, on a number line, or expressed in words, e.g., 'make a pattern that starts at 20 and shrinks by subtracting 2 each time' "
		3	Identifying and creating additive and subtractive number patterns (3s, 4s, 6s, 7s, 8s, 9s, from any starting point within 100)	• identify additive or subtractive number patterns on a number line, hundreds chart, or calendar, e.g., patterns that increase in 3s, 4s, 6s, 7s, 8s, and 9s from any starting point • describe the rule for an additive or subtractive number pattern, e.g., 'It goes up by 3s' • continue and create an additive or subtractive number pattern represented in numbers, on a number line, or expressed in words, e.g., 'make a pattern that starts at 0 and grows by adding 7 each time'
	Identifying odd and even number patterns	1	Identifying odd and even number patterns (add in number lines and number charts)	• model even and odd numbers of up to 20 using arrays with 2 rows • compare and describe the difference between the models of odd and even numbers • recognize the connection between even numbers, doubles and the 2 times-tables;- demonstrate the connection with words, models, or numbers • use the final digit of a whole number to determine whether a given number is even or odd (up to four digits)
	Exploring number patterns in tables and charts	1	Exploring number patterns represented in addition tables and charts	• identify and explore patterns in an addition table and explain using properties of operations
		2	Exploring number patterns represented in multiplication tables and charts	• identify and explore patterns in a multiplication table, e.g., all the 10 times tables are in a straight line or 4 times a number is always even

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Use the four operations with whole numbers to solve problems.

Quest	Learning Journey	Steps	Content	Detail
4.OA.A.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.				
Interpret multiplication as a comparison	Describe comparisons using multiplication language	1	Describing comparisons using the language of multiplication	• describe comparisons using the language of multiplication, e.g., 35 = 5 x 7 as 35 is 5 times as many as 7 and 7 times as many as 5
4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.				
Solving comparison word problems	Solving comparison word problems	1	Solving multiplication and division problems involving comparisons (within 100)	• solve multiplication and division problems involving comparisons e.g., 'Anna has 3 times as much money as David. David has $6. How much money does Anna have?' • write equations using a symbol, e.g., a box or a blank, to represent the unknown number • compare their own and others' methods of solution
		2	Solving word problems involving comparisons	• solve word problems involving comparisons
4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.				
Solving word problems: 4 operations	Multi-step multiplication/ division word problems	1	Solving two-step multiplication and/or division word problems, including correspondence problems	• solve two-step word problems in context involving multiplication and division;- choose the appropriate operation
		2	solve multi-step word problems involving multiplication and division	• solve multi-step word problems involving multiplication and division • represent unknown with a letter
	Solving division word problems	1	Solving division word problems	• divide a number with 3 or more digits by a single-digit divisor • solve a division problem with and without remainders • use and interpret remainders in solutions to division problems • recognize when division is required to solve word problems • check answers to mental calculations using digital technologies • use inverse operations to justify solutions to problems • use estimation to check the reasonableness of answers to division calculations

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Operations & Algebraic Thinking
Use the four operations with whole numbers to solve problems.

Quest	Learning Journey	Steps	Content	Detail
4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.				
Solving word problems: 4 operations	Solving multiplication word problems	1	Solving multiplication word problems	• apply appropriate mental strategies to solve multiplication word problems • apply appropriate written strategies to solve multiplication word problems • apply appropriate digital technologies to solve multiplication word problems • use the appropriate operation when solving problems in real-life situations • use inverse operations to justify solutions • record the strategy used to solve multiplication word problems • use selected words to describe each step of the solution process
	Two-step addition/ subtraction word problems	1	Solving addition and subtraction two-step problems in context (max sum 1000)	• read and interpret a word problem • decide with operations and strategies to use and explain why • solve an addition and subtraction two-step problem

Gain familiarity with factors and multiples.

Quest	Learning Journey	Steps	Content	Detail
4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.				
Factors, multiples and prime numbers	Finding multiples: whole numbers up to 100	1	Introducing multiples up to 100	• find 'multiples' for a given whole number
	Finding factors: whole numbers up to 100	1	Introducing factors for numbers up to 100	• determine 'factors' for a given whole number • connect number relationships involving multiplication to factors of a number

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Gain familiarity with factors and multiples.

Quest	Learning Journey	Steps	Content	Detail
4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.				
Factors, multiples and prime numbers	Prime and composite numbers	1	Introducing prime and composite numbers	• establish and define prime numbers • establish and define composite numbers • know and recall all prime numbers up to 19
		2	Identifying prime and composite numbers	• determine whether a number is prime, composite, or neither • explain whether a whole number is prime, composite, or neither by finding the number of factors, e.g., '13 has two factors (1 and 13) and therefore is prime', '21 has more than two factors (1, 3, 7, 21) and therefore is composite', '1 is neither prime nor composite as it has only one factor, itself'

Generate and analyze patterns.

Quest	Learning Journey	Steps	Content	Detail
4.OA.C.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.				
Generating number and shape patterns	Generate shape patterns from a given rule	1	Generating shape patterns from a given rule	• extend and create a shape pattern given the core of the sequence • identify apparent features of that pattern that were not explicit in the rule
	Generate addition patterns from a given rule	1	Generating addition patterns from a given rule	• extend and create a number pattern that follows an addition rule, e.g., generate the pattern when given the starting number of 1 and the rule 'add 3' • extend and create a shape pattern that follows an addition rule, e.g., a growing pattern of triangles made using matchsticks • identify apparent features of that pattern that were not explicit in the rule
	Generate subtraction patterns from a given rule	1	Generating subtraction patterns from a given rule	• extend and create a number pattern that follows a subtraction rule, e.g., generate the pattern when given the starting number of 30 and the rule 'subtract 3' • extend and create a shape pattern that follows a subtraction rule, e.g., a decreasing pattern of triangles made using matchsticks • identify apparent features of that pattern that were not explicit in the rule
	Generate multiplication patterns from a given rule	1	Generating multiplication patterns from a given rule	• extend and create a number pattern that follows a rule, e.g., 'start at 1 and multiply each term by 2 to get the next term' generates the sequence 1, 2, 4, 8, 16, 32, 64, ... • identify apparent features of that pattern that were not explicit in the rule

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Operations & Algebraic Thinking
Write and interpret numerical expressions.

Quest	Learning Journey	Steps	Content	Detail
5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.				
Using grouping symbols	Order of operations with grouping symbols	1	Introducing order of operations involving grouping symbols	• explore the use of parentheses and the order of operations in number sentences • use the term 'operations' to describe collectively the processes of addition, subtraction, multiplication, and division • perform calculations involving grouping symbols without the use of digital technologies
		2	Introducing order of operations involving multiple grouping symbols	• explore the use of multiple parentheses and the order of operations in number sentences • recognize that the grouping symbols () and [] are used in number sentences to indicate operations that must be performed first • perform calculations involving grouping symbols without the use of digital technologies
		3	Applying order of operations for mixed operations and grouping symbols	• apply the order of operations to perform calculations involving mixed operations and grouping symbols • investigate whether different digital technologies apply the order of operations • recognize when grouping symbols are not necessary
5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.				
Writing and interpreting expressions	Writing & interpreting expressions without solving	1	Writing and interpreting multi-step numerical expressions without solving	• write simple expressions without evaluating them, e.g., express the calculation 'add 8 and 7, then multiply by 2' as 2 x (8 + 7)

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Operations & Algebraic Thinking
Analyze patterns and relationships.

Quest	Learning Journey	Steps	Content	Detail
5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.**
Generating numerical patterns	Comparing numerical patterns	1	Comparing 2 pattern rules	• generate 2 numerical patterns using 2 given rules • identify apparent relationships between corresponding terms, e.g., given the rules 'Add 3' and 'Add 6' and the starting number 0, generate terms in the resulting sequences, and observe that the terms in 1 sequence are twice the corresponding terms in the other sequence • explain thinking informally
	Interpreting and creating a number pattern table	1	Interpreting and creating a table of values for number patterns involving 2 operations	• complete a table of values resulting from patterns involving 2 operations • describe the pattern in a variety of ways and record descriptions in words • interpret explanations written by peers and teachers that accurately describe shape and number patterns • use the rule to predict the next few terms and predict whether a particular value will be in the pattern
	Graphing ordered pairs from numerical patterns	1	Creating and graphing ordered pairs from 2 patterns	• create and graph ordered pairs from 2 patterns

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Mathletics

Expressions & Equations
Apply and extend previous understandings of arithmetic to algebraic expressions.

Quest	Learning Journey	Steps	Content	Detail
6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.				
Numerical expressions with exponents	Writing numerical expressions with exponents	1	Using exponential notation (positive whole number bases)	• identify the 'base' and 'exponent' of an expression written in exponential form
		2	Representing repeated multiplication of whole numbers using exponents	• represent repeated multiplication of whole numbers using exponents • represent expressions given in exponential form as the repeated multiplication of the base
		3	Writing numerical expressions involving whole-number exponents	• write numerical expressions involving whole-number exponents
	Evaluating numerical expressions with exponents	1	Evaluating expressions involving exponents without using a calculator	• evaluate expressions involving exponents without using a calculator • apply the order of operations to evaluate expressions involving exponents
6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.				
Write, read and evaluate expressions				
6.EE.A.2.A Write expressions that record operations with numbers and with letters standing for numbers.				
Writing expressions: numbers & variables	Writing expressions with numbers and variables	1	Writing expressions with numbers and variables	• write expressions with numbers and variables
6.EE.A.2.B Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.				
Parts of an expression	Identifying parts of an expression	1	Introducing algebraic expressions	• Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient)
6.EE.A.2.C Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).				
Evaluating algebraic expressions	Evaluating algebraic expressions	1	Evaluating algebraic expressions using natural numbers	• evaluate algebraic expressions using natural numbers
		2	Substituting into algebraic expressions and evaluating the result	• substitute into algebraic expressions and evaluate the result • substitute numerical values into formulas and expressions, including scientific formulas
	Evaluating expressions using order of operations	1	Applying the order of operations to evaluate expressions, including exponents, with no parentheses	• apply the order of operations to evaluate expressions, including exponents, with no parentheses

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Expressions & Equations
Apply and extend previous understandings of arithmetic to algebraic expressions.

Quest	Learning Journey	Steps	Content	Detail
6.EE.A.3 Apply the properties of operations to generate equivalent expressions.				
Properties of operations: expressions	Properties of operations: equivalent expressions	1	Applying the properties of operations to generate equivalent expressions	• apply the properties of operations to generate equivalent expressions using the distributive property • apply the properties of operations to generate equivalent expressions by combining like terms
6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).				
Equivalent expressions	Identifying equivalent expressions	1	Identifying equivalent expressions	• identify equivalent expressions

Reason about and solve one-variable equations and inequalities.

Quest	Learning Journey	Steps	Content	Detail
6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.				
Testing solutions	Testing solutions: equations	1	Using substitution to determine whether a given number in a specified set makes an equation true	• use substitution to determine whether a given number in a specified set makes an equation true
	Testing solutions: inequalities	1	Checking whether an inequality is true using substitution	• check whether an inequality is true using substitution
6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.				
Writing algebraic expressions	Writing algebraic expressions	1	Connecting algebraic language to everyday language	• translate from everyday language to algebraic language and vice versa • use algebraic symbols to represent simple situations described in words • interpret statements involving algebraic symbols in other contexts

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Expressions & Equations
Reason about and solve one-variable equations and inequalities.

Quest	Learning Journey	Steps	Content	Detail
6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.				
Solving 1-step equations	Preserving equality in equations	1	Demonstrating an understanding of equivalence and the preservation of equality or 'balance'	• understand and use the '=' sign • model preservation of equality concretely • model preservation of equality pictorially • model preservation of equality symbolically • understand that applying the same operation to both sides of an equation preserves equality
	Solving simple linear equations using models	1	Solving simple linear equations using concrete materials	• solve simple linear equations using concrete materials, such as the balance model or cups and counters, stressing the notion of performing the same operation on both sides of an equation
	1-step equations: add/subtract, positive integers	1	Solving linear equations using inverse operations involving 1 step of addition or subtraction with positive integer solutions only	• solve linear equations using inverse operations involving 1 step of addition or subtraction with positive integer solutions only
	1-step equations: add/subtract, rational numbers	1	Solving linear equations using inverse operations involving 1 step of addition or subtraction with positive integer and non-integer (decimals and fractions) solutions	• solve linear equations using inverse operations involving 1 step of addition or subtraction with positive integer and non-integer (decimals and fractions) solutions
		2	Solving linear equations using inverse operations involving 1 step of addition or subtraction with positive integer and non-integer (decimal and fraction) solutions with pronumeral on right hand side	• solve linear equations using inverse operations involving 1 step of addition or subtraction with positive integer and non-integer (decimal and fraction) solutions with pronumeral on right hand side
	1-step equations: multiply, positive integers	1	Solving linear equations using inverse operations involving 1 step of division needed with positive integer solutions only	• solve linear equations using inverse operations involving 1 step of division needed with positive integer solutions only
	1-step equations: multiply, rational numbers	1	Solving linear equations using inverse operations involving 1 step of division needed with positive integer and non-integer (decimals and fractions) solutions	• solve linear equations using inverse operations involving 1 step of division needed with positive integer and non-integer (decimals and fractions) solutions
		2	Solving linear equations using inverse operations involving 1 step of division needed with positive integer and non-integer (decimal and fraction) solutions with variable on right hand side	• solve linear equations using inverse operations involving 1 step of division needed with positive integer and non-integer (decimal and fraction) solutions with variable on right hand side

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Mathletics

Expressions & Equations
Reason about and solve one-variable equations and inequalities.

Quest	Learning Journey	Steps	Content	Detail
6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.				
Solving 1-step equations	1-step equations: division, rational numbers	1	Solving linear equations using inverse operations involving 1 step of multiplication needed with positive integer and non-integer (decimal and fraction) solutions (variable in numerator position)	• solve linear equations using inverse operations involving 1 step of multiplication needed with positive integer and non-integer (decimal and fraction) solutions (variable in numerator position)
		2	Solving linear equations using inverse operations involving 1 step of multiplication needed with positive integer and non-integer solutions (variable in numerator position)	• solve linear equations using inverse operations involving 1 step of multiplication needed with positive integer and non-integer solutions (variable in numerator position)
	Writing and solving 1-step equations	1	Writing and solving equations for real-world problems of the form x + p = q and px = q (nonnegative rational numbers)	• write and solve equations for real-world problems of the form x + p = q and px = q (nonnegative rational numbers)
6.EE.B.8 Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.				
Writing and representing inequalities	Writing inequalities	1	Writing an inequality of the form x > c or x < c in a real-world or mathematical problem	• write an inequality of the form x > c or x < c in a real-world or mathematical problem
	Represent algebraic inequalities on a number line		Representing algebraic inequalities on a number line	• represent an inequality on a number line using open or closed circles, depending on the sign to mark the end point • represent an inequality on a number line using an arrow to mark the direction in which the values hold true

Represent and analyze quantitative relationships between dependent and independent variables.

Quest	Learning Journey	Steps	Content	Detail
6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.				
Independent and dependent variables	Independent and dependent variables	1	Understanding dependent and independent variables	• use variables to represent 2 quantities in a real-world problem that change in relationship to one another;-write an equation to express 1 quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable • analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Expressions & Equations
Use properties of operations to generate equivalent expressions.

Quest	Learning Journey	Steps	Content	Detail
7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.				
Linear expressions: properties	Simplify algebraic expressions: add/subtract	1	Simplifying algebraic expressions that involve addition and subtraction	• extend and apply the laws and properties of arithmetic to algebraic terms and expressions • recognize like terms and add and subtract them to simplify algebraic expressions • verify whether a simplified expression is correct by substituting numbers for variables • connect algebra with the commutative and associative properties of arithmetic to determine that a + b = b + a and (a + b) + c = a + (b + c) • recognize the role of grouping symbols and the different meanings of expressions, such as 2a + 1 and 2(a + 1)
	Distributive property: algebraic expressions	1	Extending and applying the distributive property to the expansion of algebraic expressions	• extend and apply the distributive property to the expansion of algebraic expressions
	Factoring algebraic expressions	1	Factoring algebraic expressions by identifying numerical factors	• factor algebraic expressions by finding a common numerical factor and bringing it out the front of the parentheses with its product inside the parentheses • check factoring by performing the reverse process (applying the distributive property)
7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.				
Interpreting expressions	Rearranging expressions to interpret quantities	1	Understanding that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related	• understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that 'increase by 5%' is the same as 'multiply by 1.05'

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Quest	Learning Journey	Steps	Content	Detail
7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.				
Solving problems with rational numbers	Solving problems with rational numbers	1	Solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions and decimals)	• solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions and decimals)
	Converting terminating decimals	1	Converting terminating decimals less than 1 into fractions	• convert terminating decimals less than 1 into fractions

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Expressions & Equations
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Quest	Learning Journey	Steps	Content	Detail
**7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**				
2-step equations and inequalities				
**7.EE.B.4.A Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.**				
Solving 2-step equations	Solving 2-step equations: word problems	1	Solving word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers	• solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q and r are specific rational numbers
	2-step equations, positive integer coefficients	1	Solving linear equations using inverse operations involving 2 steps with mixed operations with positive integer solutions (variable always in numerator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with positive integer solutions (variable always in numerator position)
		2	Solving linear equations using inverse operations involving 2 steps with mixed operations with positive integer solutions (variable in numerator or denominator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with positive integer solutions (variable in numerator or denominator position)
		3	Solving linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable always in numerator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable always in numerator position)
		4	Solving linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable in numerator or denominator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable in numerator or denominator position)
	2-step equations, integer coefficients	1	Solving linear equations using inverse operations involving 2 steps with mixed operations with integer solutions (variable always in numerator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with integer solutions (variable always in numerator position) • solve concretely, pictorially, and symbolically problems that can be represented by 2-step linear equations of the form ax + b = c, where a and b and c are integers • solve concretely, pictorially, and symbolically problems that can be represented by 2-step linear equations of the form x/a + b = c, a > 0, where a and b and c are integers

Understanding Practice and Fluency (UPF)

Expressions & Equations

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Quest	Learning Journey	Steps	Content	Detail
7.EE.B.4.A Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.			
Solving 2-step equations	2-step equations, integer coefficients	2	Solving linear equations using inverse operations involving 2 steps with mixed operations with integer solutions (variable in numerator or denominator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with integer solutions (variable in numerator or denominator position)
		3	Solving linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable always in numerator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable always in numerator position)
		4	Solving linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable in numerator or denominator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable in numerator or denominator position)
	2-step equations, positive rational coefficients	1	Solving linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable always in numerator position) with variable on the right hand side	• solve linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable always in numerator position) with variable on the right hand side
			Solving linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable in numerator or denominator position) with variable on right hand side	• solve linear equations using inverse operations involving 2 steps with mixed operations with positive integer and non-integer solutions (variable in numerator or denominator position) with variable on right hand side
	2-step equations, rational coefficients	1	Solving linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable always in numerator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable always in numerator position)
		2	Solving linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable in numerator or denominator position)	• solve linear equations using inverse operations involving 2 steps with mixed operations with integer and non-integer solutions (variable in numerator or denominator position)
	2-step equations, distributive property	1	Solving linear equations (positive integer coefficients) using inverse operations involving expanding parentheses	• solve linear equations (positive integer coefficients) using inverse operations involving expanding parentheses
		2	Solving linear equations (positive integer, fraction, or decimal coefficients) using inverse operations involving expanding parentheses	• solve linear equations (positive integer, fraction, or decimal coefficients) using inverse operations involving expanding parentheses

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Expressions & Equations
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Quest	Learning Journey	Steps	Content	Detail
7.EE.B.4.B Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.			
Solving 2-step inequalities	Creating and solving 2-step inequalities	1	Creating inequalities in 1 variable and using them to solve problems	• create inequalities in 1 variable and use them to solve problems • solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q and r are specific rational numbers
	Representing inequalities	1	Representing inequalities using the signs	• represent word statements using inequalities 'greater than' and 'less than' and vice versa • represent a written or spoken inequality using symbols <, >, ≠, ≤, ≥ • write basic true inequality statements, e.g., 4 < 5
	Graphing the solution of an inequality	1	Graphing the solution set of an inequality on a number line	• represent an inequality on a number line using open or closed circles, depending on the sign to mark the end point
	Solving 2-step inequalities	1	Establishing and using the fact that when solving inequalities, if multiplying or dividing by a negative number, the inequality sign must be flipped	• establish and use the fact that when solving inequalities, if multiplying or dividing by a negative number, the inequality sign must be flipped
		2	Solving inequalities using inverse operations involving 2 steps with integer solutions	• solve inequalities using inverse operations involving 2 steps with integer solutions
		3	Solving inequalities using inverse operations involving 2 steps with integer and non-integer solutions	• solve inequalities using inverse operations involving 2 steps with integer and non-integer solutions

Expressions & Equations
Work with radicals and integer exponents.

Quest	Learning Journey	Steps	Content	Detail
8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.				
Properties of integer exponents	Using exponent notation	1	Using exponential notation (positive-integer and algebraic bases)	• represent expressions given in exponent form as the repeated multiplication of the base (positive-integer and algebraic bases)
	Product of powers, numerical base	1	Developing the exponent law for multiplying expressions with the same numerical base and positive-integer exponents	• develop the exponent law for multiplying expressions with the same numerical base and positive-integer exponents • verify the exponent laws using a calculator • understand the incorrect use of exponent laws when multiplying expressions
		2	Multiplying 2 or more terms with the same numerical base and a positive-integer power, leaving the solution in exponent form	• multiply 2 or more terms with the same numerical base and a positive-integer power, leaving the solution in exponent form
	Product of powers, algebraic base	1	Developing the exponent law for multiplying expressions with the same algebraic base and positive-integer exponents	• develop the exponent law for multiplying expressions with the same algebraic base and positive-integer exponents
		2	Multiplying 2 or more terms with the same algebraic base and positive-integer power, leaving the solution in exponent form	• multiply 2 or more terms with the same algebraic base and a positive-integer power, leaving the solution in exponent form
	Quotient of powers, numerical base	1	Developing the exponents law for dividing expressions with the same numerical base and positive-integer exponents	• develop the exponents law for dividing expressions with the same numerical base and positive-integer exponents • verify the exponents laws using a calculator • understand the incorrect use of exponents law when dividing expressions
		2	Dividing 2 or more terms with the same numerical base and a positive-integer power, leaving the solution in exponent form	• divide 2 or more terms with the same numerical base and a positive-integer power, leaving the solution in exponent form
	Quotient of powers, algebraic base	1	Developing the properties of exponents for dividing expressions with the same algebraic base and positive-integer exponents	• develop the properties of exponents for dividing expressions with the same algebraic base and positive-integer exponents
		2	Dividing 2 or more terms with the same algebraic base and a positive-integer power, leaving the solution in exponent form	• divide 2 or more terms with the same algebraic base and a positive-integer power, leaving the solution in exponent form

Expressions & Equations
Work with radicals and integer exponents.

Quest	Learning Journey	Steps	Content	Detail
8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.				
Properties of integer exponents	Power of a power, numerical base	1	Developing the exponent laws for raising an expression in exponent form to another exponent (positive numerical bases, positive-integer exponents)	• develop the properties of exponents for raising an expression in exponent form to another exponent (positive numerical bases, positive-integer exponents) • verify the properties of exponents using a calculator • understand the incorrect use of properties of exponents when raising an expression in exponent form to another exponent
		2	Calculating an expression in which a number in exponent form is raised by a positive-integer power	• calculate an expression in which a number in exponent form is raised by a positive-integer power
	Power of a power, algebraic base	1	Calculating an expression in which a number with an algebraic base in exponent form is raised by a positive-integer power	• calculate an expression in which a number with an algebraic base in exponent form is raised by a positive-integer power
	Zero exponents, numerical base	1	Applying properties of exponents: Zero exponent (positive whole number bases)	• establish the meaning of the zero exponent for expressions with positive numerical bases • apply the zero exponent to simplify expressions involving the zero exponent and positive numerical bases
	Zero exponents, algebraic base	1	Applying exponent laws: Zero exponent (algebraic bases)	• establish the meaning of the zero exponent for expressions with algebraic bases • apply the zero exponent law to simplify expressions involving a zero exponent and algebraic bases
	Quotient of powers, algebraic base	1	Developing the properties of exponents for dividing expressions with the same algebraic base and positive-integer exponents	• develop the properties of exponents for dividing expressions with the same algebraic base and positive-integer exponents
		2	Dividing 2 or more terms with the same algebraic base and a positive-integer power, leaving the solution in exponent form	• divide 2 or more terms with the same algebraic base and a positive-integer power, leaving the solution in exponent form
	Negative exponents, numerical base	1	Applying exponent laws: Negative exponents (positive whole number bases)	• establish the meaning of the negative exponent for expressions with positive numerical bases • write expressions with a negative exponent as an expression with a positive exponent
	Negative exponents, algebraic base	1	Applying properties of exponents: Negative exponent (algebraic bases)	• establish the meaning of the negative exponent for expressions with algebraic bases • write expressions with a negative exponent as an expression with a positive exponent
	Simplifying expressions, numerical base	1	Applying various exponent laws to equations to simplify expressions	• apply the necessary exponent law(s) to simplify expressions of 2 or more terms involving exponents with numerical bases and the operations of multiplication, division, power of a power, and the zero exponent
	Simplifying expressions, algebraic base	1	Selecting and applying various properties of exponents to equations to simplify expressions (algebraic bases)	• select and apply the necessary properties of exponents and apply them to simplify expressions of 2 or more terms involving exponents with algebraic bases and the operations of multiplication, division, power of a power, and the zero power

Mathletics

Expressions & Equations
Work with radicals and integer exponents.

Quest	Learning Journey	Steps	Content	Detail
8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.			
Square and cube roots	Squares and square roots	1	Recognizing the link between squares and square roots	• recognize the link between squares and square roots
		1	Knowing that when the √ symbol is used, that it is conventionally referring to the principal square root which is the positive square root	• know that when the √ symbol is used, that it is conventionally referring to the principal square root which is the positive square root
		2	Finding square roots of perfect square whole numbers only	• find the square roots of perfect square whole numbers up to 100
	Evaluating expressions with square and cube roots	1	Evaluating expressions involving square roots and cube roots without a calculator	• evaluate expressions involving square roots and cube roots by applying the order of operations, without a calculator
	Square roots of fractions and decimals	1	Finding square roots of fractions with perfect square numerators and denominators	• find the square roots of fractions with perfect square numerators and denominators
		2	Finding square roots of decimals	• find the square roots of decimals
	Cubes and cube roots	1	Recognizing the link between cubes and cube roots	• recognize the link between cubes and cube roots
		2	Finding cube roots of perfect cube whole numbers	• find the cube roots of perfect cube whole numbers up to 125
		2	Introducing scientific notation for whole numbers	• understand that scientific notation is a way of writing numbers which has 2 parts to it
		2	Introducing scientific notation for whole numbers	• establish how to write 1, 10, 100, 1000 etc as an exponent of the 10
8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.			
Writing numbers in scientific notation	Introducing scientific notation	1	Introducing scientific notation for whole numbers	• write whole numbers as a number between 1 and 10 multiplied by 10, 100, 1000 etc • represent whole numbers in scientific notation
	Converting scientific notation to standard form	1	Converting from scientific notation to standard form for very large numbers	• convert from scientific notation to standard form for very large numbers
		2	Converting from scientific notation to standard form for very small numbers	• convert from scientific notation to standard form for very small numbers
	Converting standard form to scientific notation	1	Converting from standard form to scientific notation for very large numbers	• convert from standard form to scientific notation for very large numbers
		2	Converting from standard form to scientific notation for very small numbers	• convert from standard form to scientific notation for very small numbers

Expressions & Equations
Work with radicals and integer exponents.

Quest	Learning Journey	Steps	Content	Detail
8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology**				
Calculations in scientific notation	Calculations in scientific notation	1	Calculating in scientific notation	• perform calculations involving scientific notation (without a calculator) applying laws of exponents where there is 1 parentheses • perform calculations involving scientific notation (without a calculator) using laws of exponents and 2 parentheses to be multiplied • perform calculations involving scientific notation (without a calculator) using laws of exponents with 2 parentheses involving division
		2	Using the calculator for scientific notation	• perform calculations involving scientific notation (with a calculator) • solve problems in context using scientific notation, with and without a calculator

Understand the connections between proportional relationships, lines, and linear equations.

Quest	Learning Journey	Steps	Content	Detail
8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.				
Proportional relationships	Graphing proportional relationships	1	Graphing proportional relationships	• graph proportional relationships • interpret the unit rate as the slope of the graph
	Comparing proportional relationships	1	Comparing 2 different proportional relationships represented in different ways	• compare 2 different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of 2 moving objects has greater speed
8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.**				
Understanding slope and y-intercept	Using similar triangles to understand slope	1	Using similar triangles to explain why the slope m is the same between any 2 distinct points on a non-vertical line on the coordinate plane	• use similar triangles to explain why the slope m is the same between any 2 distinct points on a non-vertical line on the coordinate plane
	Writing equations of proportional relationships	1	Deriving the equation y = mx for a line through the origin	• derive the equation y = mx for a line through the origin
	Writing equations of nonproportional relationships	1	Deriving the equation y = mx + b for a line intercepting the vertical axis at b	• derive the equation y = mx + b for a line intercepting the vertical axis at b

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Expressions & Equations
Understand the connections between proportional relationships, lines, and linear equations.

Quest	Learning Journey	Steps	Content	Detail
8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.				
Understanding slope and y-intercept	Identifying the slope in an equation or graph	1	Establishing that when given in the form y = mx + b, m is the slope in the form rise/run	• establish that when given in the form y = mx + b, m is the slope in the form rise/run • understand that the slope is the same between any 2 points on a line
		2	Understanding that the slope of a line is in the form rise/run	• understand that the slope of a line is in the form rise/run • understand how a negative and positive slope differ
	Identifying the y-intercept on a graph	1	Establishing that when given in the form y = mx + b, b is the y-intercept	• establish that when given in the form y = mx + b, b is the y-intercept • explain why b is always the y-intercept
	Graphing equations in slope-intercept form	1	Graphing a linear relationship on the coordinate plane using the slope and y-intercept when the equation is in the form y = mx + b	• graph a linear relationship on the coordinate plane using the slope and y-intercept when the equation is in the form y = mx + b by first plotting the y-intercept • find a second point on the line using the slope in the form rise/run • use correct graphing conventions when graphing (arrows, line to the edge, etc.)
	Graphing equations not in slope-intercept form	1	Graphing a linear relationship on a coordinate plane using the slope and y-intercept when the equation is not in the form y = mx + b by rearranging to be in this form	• graph a linear relationship on a coordinate plane using the slope and y-intercept when the equation is not in the form y = mx + b by rearranging to be in this form first
	Finding the y-intercept algebraically	1	Establishing and using the fact that substituting x = 0 into a linear equation will give you the y-intercept	• substitute x = 0 into a linear equation in order to find the y-intercept • reproduce the y-intercept in coordinate form

Expressions & Equations
Analyze and solve linear equations and pairs of simultaneous linear equations.

Quest	Learning Journey	Steps	Content	Detail
8.EE.C.7 Solve linear equations in one variable.				
Solving linear equations in one variable				
8.EE.C.7.A Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).				
Solution types of linear equations	Solution types of linear equations	1	Giving examples of linear equations in 1 variable with 1 solution, infinitely many solutions, or no solutions	• give examples of linear equations in 1 variable with 1 solution, infinitely many solutions or no solutions • show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers)
8.EE.C.7.B Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.				
Solving linear equations	Solving 3-step linear equations	1	Solving linear equations (integer coefficients) using inverse operations involving 3 steps with mixed operations with integer solutions	• solve linear equations (integer coefficients) using inverse operations involving 3 steps with mixed operations with integer solutions
		2	Solving linear equations (integer coefficients) using inverse operations involving 3 steps with mixed operations with integer and non-integer solutions	• solve linear equations (integer coefficients) using inverse operations involving 3 steps with mixed operations with integer and non-integer solutions
		3	Solving linear equations (integer, fraction or decimal coefficients) using inverse operations involving 3 steps with mixed operations with integer and non-integer solutions	• solve linear equations (integer, fraction or decimal coefficients) using inverse operations involving 3 steps with mixed operations with integer and non-integer solutions
	Solving linear equations, variables on both sides	1	Solving linear equations (integer coefficients) using inverse operations involving variables on both sides of the equation	• solve linear equations (integer coefficients) using inverse operations involving variables on both sides of the equation
		2	Solving linear equations (integer, fraction or decimal coefficients) using inverse operations involving variables on both sides of the equation	• solve linear equations (integer, fraction or decimal coefficients) using inverse operations involving variables on both sides of the equation
	Solving linear equations, distributive property	1	Solving linear equations (integer coefficients) using inverse operations involving expanding parentheses	• solve linear equations (integer coefficients) using inverse operations involving expanding parentheses • solve concretely, pictorially, and symbolically equations involving expanding parentheses of the form a(x + b) = c where a and b and c are integers
		2	Solving linear equations (integer, fraction, or decimal coefficients) using inverse operations involving expanding parentheses	• solve linear equations (integer, fraction, or decimal coefficients) using inverse operations involving expanding parentheses
	Using substitution to check solutions	1	Checking solutions to equations by substituting	• check solutions to equations by substituting

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Mathletics

Expressions & Equations
Analyze and solve linear equations and pairs of simultaneous linear equations.

Quest	Learning Journey	Steps	Content	Detail
8.EE.C.8 Analyze and solve pairs of simultaneous linear equations.				
Systems of equations				
8.EE.C.8.A Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.				
Identify solutions, systems of equations	Identify solutions, systems of equations	1	Understanding systems of equations	• understand that solutions to a system of 2 linear equations in 2 variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously
8.EE.C.8.B Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.				
Solving systems of equations	Solving systems of equations graphically	1	Solving systems of equations with 2 variables graphically	• solve systems of equations graphically • graph 2 intersecting lines on the coordinate plane and read off the point of intersection
	Solving systems of equations using elimination	1	Solving systems of equations algebraically using the elimination method	• solve systems of equations algebraically using the elimination method
	Solving systems of equations using substitution	1	Solving systems of equations algebraically using the substitution method	• solve systems of equations algebraically using the substitution method
	Checking the solution of a system of equations	1	Checking the solution of systems of equations either graphically or algebraically	• check the solution of systems of equations either graphically or algebraically
8.EE.C.8.C Solve real-world and mathematical problems leading to two linear equations in two variables.				
Writing and solving systems of equations	Writing and solving systems of equations	1	Constructing and solving a system of equations from text by deriving from a problem	• construct and solve a system of equations from text by deriving from a problem

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Mathletics

Functions
Define, evaluate, and compare functions.

Quest	Learning Journey	Steps	Content	Detail
8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.				
Identifying functions	Identifying functions	1	Defining a function as a rule or relationship where for each input value there is only 1 output value, or that associates every member of 1 set with exactly 1 member of a second set	• define a function as a rule or relationship where for each input value there is only one output value, or that associates every member of one set with exactly one member of a second set
			Defining a function as a rule or relationship where for each input value there is only 1 output value, or that associates every member of 1 set with exactly 1 member of a second set	• understand the difference between a function and a relation
			Defining a function as a rule or relationship where for each input value there is only 1 output value, or that associates every member of 1 set with exactly 1 member of a second set	• decide whether a given relationship is a function or a relation
		2	Using the vertical line test on a graph to decide whether it represents a function or a relation	• use the vertical line test on a graph to decide whether it represents a function or a relation
8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).				
Comparing functions	Comparing functions represented in different ways	1	Comparing properties of two functions represented in a different way	• Comparing properties of two functions represented in a different way (equations, graphs, tables)
8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.				
Interpret y = mx + b as linear	Represent linear relationships in different forms	1	Representing linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form y = mx + b	• represent linear relationships using verbal descriptions, tables, graphs and equations that simplify to the form y = mx + b
	Equations of linear and non-linear relationships	1	Exploring graphs of linear and non-linear relationships	• determine and explain differences between equations that represent linear relationships and those that represent non-linear relationships

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Functions
Use functions to model relationships between quantities.

Quest	Learning Journey	Steps	Content	Detail
8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.				
Rate of change and initial value	Rate of change and initial value	1	Constructing a function to model a linear relationship between two quantities	• determine the rate of change and initial value from a table or graph • interpret the rate of change and initial value from a graph or table of values
8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.				
Distance-time graphs	Distance-time graphs	1	Plotting distance-time graphs from a given set of information	• plot distance-time graphs from a given set of information
		2	Analyzing a given distance-time graph	• analyze a given distance-time graph

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.				
Rounding to the nearest 10 or 100	Rounding numbers up to 1000 to the nearest 100	1	Rounding numbers up to 1000 to the nearest 100	• Rounding numbers up to 1,000 to the nearest 100
	Rounding numbers up to 1000 to the nearest 10	1	Rounding numbers up to 1000 to the nearest 10	• Rounding numbers up to 1,000 to the nearest 10
3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.				
Add and subtract within 1000	Add 2- and 3-digit numbers: number line	1	Adding 2-digit and 3-digit numbers using place value partitioning on a number line (jump strategy)	• model and solve the addition of a 2-digit and 3-digit number using an empty number line, e.g., 823 + 56 as 823 + 50 = 873, 873 + 6 = 879
	Add 2- and 3-digit numbers: jump strategy	1	Adding 2-digit and 3-digit numbers mentally using place value understanding (jump strategy)	• mentally solve addition problems involving 2-digit and 3-digit numbers using a jump strategy, e.g., 823 + 56 as 823 + 50 = 873, 873 + 6 = 879 • record and explain the use of the strategy • check calculations using the inverse operation
	Add two 2-digit numbers: base ten blocks	1	Bridging to ten to add two 2-digit numbers using models for support	• add to the nearest ten first then add the rest, using models for support, e.g., 28 + 17 as 28 + 2 = 30 and 30 + 15 = 45 • record and explain the use of the strategy
	Add 2- and 3-digit numbers: expanded form	1	Adding a 2-digit and 3-digit number using place value models (split strategy)	• model the addition of a 2-digit and 3-digit number using a split strategy with or without crossing tens;- use place value manipulatives, money, or diagrams • solve addition problems using a split strategy, e.g., 265 + 27 as 260 + 20 and 5 + 7, 280 + 12 = 292 • record and explain the use of the strategy
	Add two 2-digit numbers: compensation	1	Introducing addition using rounding and compensating with two 2-digit numbers	• add two 2-digit numbers where 1 number is close to a ten (digit in the ones column is 7, 8, or 9) • round 1 number to the next 10, carry out the addition and adjust the answer to compensate for the original rounding, e.g., 35 + 29 as 35 + 30 – 1 • record the strategy using numbers, models, and/or diagrams and explain the need to compensate
	Subtract 2-digit from 3-digit: number line	1	Subtracting a 2-digit number from a 3-digit number using place value partitioning on a number line (jump strategy)	• model and solve the subtraction of a 2-digit number from a 3-digit number using an empty number line, e.g., 823 – 56 as 823 – 50 = 773, 773 – 6 = 767
	Subtract 2-digit from 3-digit: jump strategy	1	Subtracting a 2-digit number from a 3-digit number mentally using place value understanding (jump strategy)	• mentally solve subtraction problems involving 2-digit and 3- digit numbers using place value partitioning, e.g., 823 – 56 as 823 – 50 = 773, 773 – 6 = 767 • record and explain the use of the strategy • check calculations using the inverse operation

RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.				
Add and subtract within 1000	Subtract two 2-digit numbers: base ten blocks	1	Bridging to ten to subtract two 2-digit numbers using models for support	• subtract to the nearest ten first then subtract the rest using models for support, e.g., 33 – 18 as 33 – 3 – 10 – 5 • record and explain the use of the strategy
	Subtract 2-digit from 3-digit: expanded form	1	Subtracting a 2-digit number from a 3-digit number using place value models (split strategy)	• model the subtraction of a 2-digit and 3-digit number using a split strategy;- place value manipulatives, money, or diagrams • solve subtraction problems using a split strategy, e.g., 265 – 21 as 260 – 20 and 5 – 1, 240 + 4 = 244 • record and explain the use of the strategy
	Subtract two 2-digit numbers: compensation	1	Introducing subtraction using rounding and compensating with two 2-digit numbers	• subtract two 2-digit numbers where 1 number is close to a ten • round 1 number to the next 10, carry out the subtraction and adjust the answer to compensate for the original rounding, e.g., 33 – 19 as 33 – 20 + 1 or 81 – 35 as 80 – 35 + 1 • record the strategy using numbers, models, and/or diagrams and explain the need to compensate
	Add and subtract up to 3-digits: number line	1	Adding and subtracting a 2-digit and 3-digit number using place value partitioning on a number line (jump strategy)	• model and solve the addition or subtraction of a 2-digit number from a 3-digit number using an empty number line, e.g., 823 – 56 as 823 – 50 = 773, 773 – 6 = 767
	Add and subtract up to 3-digits: jump strategy	1	Adding and subtracting a 2-digit and 3-digit number mentally using place value understanding (jump strategy)	• mentally solve addition and subtraction problems involving 2-digit and 3- digit numbers using place value partitioning, e.g., 823 – 56 as 823 – 50 = 773, 773 – 6 = 767
	Add and subtract two 2-digits: place value blocks	1	Bridging to ten to mentally add and subtract two 2-digit numbers	• add or subtract to the nearest ten first then add or subtract the rest, using models for support, e.g., 28 + 17 as 28 + 2 = 30 and 30 + 15 = 45 • check calculations using the inverse operation
	Add and subtract up to 3-digits: expanded form	1	Adding and subtracting 2-digit and 3-digit numbers using place value models (split strategy)	• model the addition or subtraction of a 2-digit and 3-digit number using a split strategy;- place value manipulatives, money, or diagrams • solve addition and subtraction problems using a split strategy, e.g., 265 – 21 as 260 – 20 and 5 – 1, 240 + 4 = 244 • record and explain the strategy using numbers, models, and/or diagrams • check calculations using the inverse operation
	Add and subtract two 2-digits: compensation	1	Introducing addition and subtraction using rounding and compensating with two 2-digit numbers	• add or subtract two 2-digit numbers where 1 number is close to a ten (digit in the ones column is 7, 8, or 9) • round 1 number to the next 10, carry out the addition or subtraction and adjust the answer to compensate for the original rounding, eg 33 + 19 as 33 + 20 - 1 or 81 + 35 as 80 + 35 + 1 • check calculations using the inverse operation

Understanding Practice and Fluency (UPF)

Number & Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 using strategies based on place value and properties of operations.				
Multiplying by a multiple of 10	Using place value to multiply by multiples of 10	1	Using place value to multiply (x 10)	• model the multiplication of a 1-digit number and a multiple of 10 using place value manipulatives or models, e.g., model 4 groups of 30 using tens rods • relate to known facts and place value understanding, e.g., 4 x 3 = 12 so 4 x 3 tens = 12 tens or 120
	Multiplying by a multiple of 10	1	Multiplying by a multiple of 10	• relate to known facts and place value understanding, e.g., 4 x 3 = 12 so 4 x 3 tens = 12 tens or 120 • use skip counting to solve, e.g., 4 x 30 as 30 + 30 + 30 + 30 • multiply by factorizing the multiple and represent with drawings or models, e.g., 4 x 30 as 4 x 3 x 10

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations—Fractions
Develop understanding of fractions as numbers.

Quest	Learning Journey	Steps	Content	Detail
3.NF.A.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.				
Introducing fractions	Introducing the numerator and denominator	1	Introducing the terms numerator and denominator	• read and write symbols to represent fractions • use the terms denominator and numerator to describe a fraction
	Introducing eighths	1	Introducing eighths of objects or shapes	• find eighths of objects and shapes • recognize equivalence with halves and quarters • use the language of 'one eighth', 'two eighths', and so forth along with standard fractional notation
	Halves, quarters and eighths of objects or shapes	1	Finding halves, quarters, and eighths of objects or shapes	• recognize equivalence • estimate the size of a fractional part before using, e.g., paper folding to check or estimate the size of the whole from the part • find the whole from a part • find halves, quarters, and eighths of uneven partitioned shapes • use symbols for halves, quarters, and eighths • recognize larger denominator = smaller parts
	Halves, thirds or quarters of shapes: partitioning	1	Finding halves, thirds, or quarters of shapes using partitioning	• recognize that equal shares are not always the same shape
	Introducing sixths	1	Introducing sixths	• find sixths of objects and shapes • find sixths of sets • estimate the size of a fractional part before using, e.g., paper folding to check or estimate the size of the whole from the part • find the whole from a part • use language 'one sixth', 'two sixths', 'three sixths' • use symbols to represent: 1/6, 2/6, 3/6 • understand the relationship between thirds and sixths
	Thirds and sixths of objects, shapes and sets	1	Finding thirds and sixths of objects, shapes, and sets	• recognize equivalence • find thirds and sixths of objects, shapes, and lengths • find thirds and sixths of sets (using models) • find the whole from a part • find thirds and sixths of uneven partitioned shapes • use language 'one third', 'two thirds', 'three thirds' • use fractional notation

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Develop understanding of fractions as numbers.

Quest	Learning Journey	Steps	Content	Detail
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.				
Fractions on the number line				
3.NF.A.2.A Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.				
Locating unit fractions on a number line	Locating unit fractions on a number line	1	Locating unit fractions on a number line (denominators 2, 3, 4, 6, 8)	• locate unit fractions on a number line (denominators 2, 3, 4, 6, 8)
3.NF.A.2.B Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.				
Locating fractions on a number line	Locating fractions on a number line	1	Locating fractions on a number line (denominators 2, 3, 4, 6, 8)	• locate fractions on a number line (denominators 2, 3, 4, 6, 8)
3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.				
Fraction equivalence				
3.NF.A.3.A Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.				
Investigating equivalent fractions	Investigating equivalent fractions	1	Investigating simple equivalent fractions less than 1 using concrete materials and/or models (denominators 2, 3, 4, 6, 8)	• use number lines to identify equivalent fractions • use a fraction wall to identify equivalent fractions
3.NF.A.3.B Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent.				
Finding simple equivalent fractions	Recognize and generate simple equivalent fractions	1	Finding simple equivalent proper fractions (denominators 2, 3, 4, 6, 8)	• recognize and generate simple equivalent fractions (denominators 2, 3, 4, 6, 8) • explain why the fractions are equivalent by using a visual fraction model
3.NF.A.3.C Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.				
Whole numbers as fractions	Express and recognize whole numbers as fractions	1	Expressing whole numbers as fractions	• express whole numbers as fractions
		2	Identifying fractions that are equivalent to 1 whole on a number line (denominators 2, 3, 4, 6, 8)	• identify fractions that are equivalent to 1 whole on a number line (denominators 2, 3, 4, 6, 8)
3.NF.A.3.D Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.				
Compare fractions	Comparing fractions: same numerator or denominator	1	Comparing fractions with the same numerator up to 1 using >, =, < (denominators 2, 3, 4, 6, 8)	• compare fractions with the same numerator up to 1 using >, =, < (denominators 2, 3, 4, 6, 8)
		2	Comparing fractions with the same denominator up to 1 using >, =, < (denominators 2, 3, 4, 6, 8)	• compare fractions with the same denominator up to 1 using >, =, < (denominators 2, 3, 4, 6, 8)

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Generalize place value understanding for multi-digit whole numbers.

Quest	Learning Journey	Steps	Content	Detail
4.NBT.A.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.				
Generalizing place value understanding	Generalizing place value understanding	1	Understanding the relationship between place value positions	• recognize that in a multi-digit number a digit in 1 place represents 10 times as much as it represents in the place to its right • recognize that in a multi-digit number a digit in 1 place represents 1/10 of what it represents in the place to its left
4.NBT.A.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.				
Reading and writing multi-digit numbers	Reading and writing multi-digit numbers	1	Reading and writing 6-digit numbers	• apply an understanding of place value to read numbers of up to 6 digits • apply an understanding of place value to write numbers of up to 6 digit
	Comparing two 6-digit numbers	1	Comparing two 6-digit numbers	• compare two 6-digit numbers using words and symbols <, =, >
4.NBT.A.3 Use place value understanding to round multi-digit whole numbers to any place.				
Rounding 6-digit numbers	Rounding 6-digit numbers to any place value	1	Rounding 6-digit numbers	• round 6-digit numbers to any place value

Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.				
Add/subtract multi-digit numbers	Adding multi-digit numbers, no regrouping	1	Using a formal written algorithm for addition calculations up to five-digit numbers (no regrouping)	• apply algorithms to solve problems without regrouping, with the same number of places and with a different number of places ;- include opportunities for students to write their own algorithms with digits in correct place value positions;- include word problems • use estimation or reverse operation to check the reasonableness of solutions
	Adding multi-digit numbers, regrouping	1	Using a formal written algorithm for addition calculations up to five-digit numbers (with regrouping)	• apply algorithms to solve problems with regrouping in 1 or more places, with the same number of places and with a different number of places;- include opportunities for students to write their own algorithms with digits in correct place value positions;- include word problems • use estimation or reverse operation to check the reasonableness of solutions

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.				
Subtracting multi-digit numbers, no regrouping	Subtracting multi-digit numbers, no regrouping	1	Using a formal written algorithm to record subtraction calculations involving up to five-digit numbers (without regrouping)	• apply algorithms to solve problems without regrouping, with the same number of places for both numbers, with fewer places in the second number (subtrahend) and with and without 1 or more zeros in the first number (minuend);- include opportunities for students to write their own algorithms with digits in correct place value positions and with the larger number first;- include word problems • use estimation or reverse operation to check the reasonableness of solutions
	Subtracting multi-digit numbers, regrouping	1	Using a formal written algorithm to record subtraction calculations involving up to five-digit numbers (with regrouping)	• apply algorithms to solve problems with regrouping in 1 or more places, with the same number of places for both numbers, with fewer places in the second number (subtrahend) and with and without 1 or more zeros in the first number (minuend);- include opportunities for students to write their own algorithms with digits in correct place value positions and with the larger number first;- include word problems • use estimation or reverse operation to check the reasonableness of solutions
4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				
Multiplying numbers: place value	Multiply multi-digit numbers, expanded algorithm	1	Multiplying 3-digit numbers by 1-digit numbers using the expanded algorithm	• multiply the ones, then the tens, then the hundreds, with and without regrouping • model the method with place value models or diagrams;- relate to the area model • check answers to mental calculations using inverse solutions or digital technologies
		2	Multiplying 4-digit numbers by 1-digit numbers using the expanded algorithm	• multiply the ones, then the tens, then the hundreds, and then the thousands, with and without regrouping • model the method with place value models or diagrams;- relate to the area model • check answers to mental calculations using inverse solutions or digital technologies
	Multiply 2-digit by 2-digit, expanded algorithm	1	Multiplying 2-digit numbers by 2-digit numbers using the expanded form of the formal algorithm	• multiply 2-digit by 2-digit numbers using expanded form, with and without regrouping • check answers to mental calculations using digital technologies • use inverse operations to justify solutions

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Number & Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				
Multiplying numbers: place value	Multiply multi-digit numbers using place value	1	Multiplying 3-digit numbers by 1-digit numbers using decomposing method	• multiply the hundreds, then the tens, and then the ones • check answers to mental calculations using digital technologies • use inverse operations to justify solutions
		2	Multiplying 4-digit numbers by 1- digit numbers using decomposing method	• multiply the thousands, then the hundreds, then the tens, and then the ones • check answers to mental calculations using digital technologies • use inverse operations to justify solutions
	Multiply multi-digit numbers, area model	1	Multiplying 3-digit numbers by 1-digit numbers using an area model	• use an area model for 3-digit by 1-digit multiplication • check answers to mental calculations using digital technologies • use inverse operations to justify solutions
		2	Multiplying 4-digit numbers by 1-digit numbers using an area model	• use an area model for 4-digit by 1-digit multiplication • check answers to mental calculations using digital technologies • use inverse operations to justify solutions
	Multiply 2-digit by 2-digit, area model	1	Multiplying 2-digit numbers by 2-digit numbers using an area model	• use an area model for 2-digit by 2-digit multiplication • check answers to mental calculations using digital technologies • use inverse operations to justify solutions
4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				
Dividing numbers: place value	Dividing numbers, place value blocks	1	Dividing a 3-digit number by a 1-digit number using expanded form and using models for support	• use expanded form to divide a 3-digit number using models for support
	Dividing numbers, area model	1	Dividing a 3-digit number by a 1-digit number using factoring using models	• solve division problems by splitting factors, eg 125 ÷ 5 as (100 ÷ 5) + (25 ÷ 5) using models such as rectangular arrays, area models
		2	Dividing up to 4-digit numbers by 1-digit divisors using the distributive property with models for support	• solve division problems by splitting factors, e.g., 125 ÷ 5 as (100 ÷ 5) + (25 ÷ 5) using models • illustrate and explain the calculation using equations, rectangular arrays and/or area models
	Dividing numbers, place value strategy	1	Dividing up to 4-digit numbers by 1-digit divisors using the distributive property	• solve division problems by splitting factors, e.g., 125 ÷ 5 as (100 ÷ 5) + (25 ÷ 5) • explain and justify the use of the strategy

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Number & Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.

Quest	Learning Journey	Steps	Content	Detail
4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				
Dividing numbers: place value	Introducing remainders in division	1	Introducing remainders in division problems	• model division, including where the answer involves a remainder, using concrete materials • explain why a remainder is obtained in answers to some division problems • use mental strategies to divide a 2-digit number by a 1-digit number in problems for which answers include a remainder • record remainders to division problems in words • interpret the remainder in the context of a word problem

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations—Fractions
Extend understanding of fraction equivalence and ordering.

Quest	Learning Journey	Steps	Content	Detail
4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.				
Investigating fraction equivalence	Equivalent fractions with models	1	Investigating equivalent fractions up to and including 1 whole using area models (denominators 2, 4, and 8; 3 and 6; 5 and 10 and 100)	• model, compare, and represent the equivalence of fractions with related denominators by redividing the whole, using identical area models fraction walls and bar models
			Investigating equivalent fractions up to and including 1 whole using multiplication (denominators of 2, 4 and 8; 3 and 6; 5, 10 and 100)	• model, compare, and represent the equivalence of fractions by recognizing the factorial relationship between the numerators and denominators
	Equivalent fractions with multiplication	1	Investigating equivalent fractions up to and including 1 whole using multiplication (denominators of 2, 4 and 8; 3 and 6; 5, 10 and 100)	• create equivalent fractions using multiplication
4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions.				
Comparing fractions	Compare fractions using models	1	Comparing and ordering common fractions with different denominators using models and diagrams	• compare and order common fractions using models and diagrams for support • compare and order common fractions with different denominators (halves, thirds, quarters, fifths, sixths, sevenths, eighths)
	Compare fractions, different numerator/ denominator	1	Comparing and ordering proper fractions with different numerators and denominators (denominators of 2, 3, 4, 5, 6, 8, 10, 12)	• compare and order proper fractions using a benchmark fraction for support, e.g., half or quarter • record comparisons using >, <, or = • recognize that comparisons are only valid when the 2 fractions refer to the same whole
	Compare fractions using common denominators	1	Using common denominators to compare and order proper fractions with related denominators	• compare and order using <, >, =
			Using common denominators to compare and order proper fractions with unrelated denominators	• find a common denominator to compare fractions
		2	Using common denominators to compare and order proper fractions with unrelated denominators	• compare and order using <, >, =

Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Build fractions from unit fractions.

Quest	Learning Journey	Steps	Content	Detail
			4.NF.B.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b.	
			Fractions: the sum of unit fractions	
			4.NF.B.3.A Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	
Understand adding/ subtracting fractions	Adding unit fractions, same denominators: models	1	Using models to add unit fractions with the same denominators (1-20) to make fractions up to and including 1 whole	• use models to add unit fractions with the same denominator to make fractions up to and including one whole, e.g., 1/3 + 1/3 + 1/3
	Adding fractions, same denominator	1	Adding simple fractions with the same denominator using models to make fractions up to and including 1 whole	• use models to add 2 or more fractions with the same denominator (up to and including one whole) • solve problems involving adding fractions with the same denominator
		2	Adding simple fractions with the same denominator using models (up to 3 wholes)	• use models to add 2 or more fractions with the same denominator • solve problems involving adding fractions with the same denominator • record answers greater than 1 as an improper fraction
		3	Adding proper fractions with the same denominator (denominators 2, 3, 4, 5, 6, 7, 8,)	• add proper fractions with the same denominator • model and represent strategies, including using diagrams and written representations
	Subtracting fractions, same denominator	1	Subtracting simple fractions with the same denominator using models, including subtracting from 1 whole	• use models to subtract 2 or more fractions with the same denominator (including subtracting from one whole) • solve problems involving adding fractions with the same denominator
		2	Subtracting simple fractions with the same denominator using models (up to 3 wholes)	• use models to subtract 2 or more fractions with the same denominator • solve problems involving adding fractions with the same denominator • record answers greater than 1 as an improper fraction
		3	Subtracting proper fractions with the same denominator (denominators 2, 3, 4, 5, 6, 7, 8,)	• subtract proper fractions with the same denominator • model and represent strategies, including using diagrams and written representations

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Build fractions from unit fractions.

Quest	Learning Journey	Steps	Content	Detail
4.NF.B.3.A Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.				
Understand adding/ subtracting fractions	Adding and subtracting fractions, same denominator	1	Adding and subtracting simple fractions with the same denominator using models to make fractions up to and including one whole	• use models to add or subtract 2 or more fractions with the same denominator • solve problems involving adding or subtracting fractions with the same denominator
		2	Adding and subtracting simple fractions with the same denominator using models (up to 3 wholes)	• use models to add or subtract 2 or more fractions with the same denominator • solve problems involving adding or subtracting fractions with the same denominator • record answers greater than 1 as an improper fraction
		3	Adding and subtracting proper fractions with the same denominator (denominators 2, 3, 4, 5, 6, 7, 8,)	• add and subtract proper fractions with the same denominator • model and represent strategies, including using diagrams and written representations
4.NF.B.3.B Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.				
Decomposing fractions	Decomposing fractions	1	Decomposing proper fractions and fractions equal to 1	• decompose a fraction into a sum of fractions with the same denominator in more than 1 way, e.g., 3/8 = 1/8 + 1/8 + 1/8;- 3/8 = 2/8 + 1/3
		2	Decomposing improper fractions and fractions greater than 1	• decompose a fraction into a sum of fractions with the same denominator in more than 1 way, e.g., 4 and 3/8 = 2 and 1/8 + 2 and 2/8
4.NF.B.3.C Add and subtract mixed numbers with like denominators.				
Adding and subtracting mixed numbers	Adding mixed numbers, same denominator	1	Adding mixed numbers with the same denominator	• add mixed numbers with the same denominator • model and represent strategies, including using diagrams and written representations
	Subtracting mixed numbers, same denominator	1	Subtracting mixed numbers with the same denominator	• subtract mixed numbers with the same denominator • model and represent strategies, including using diagrams and written representations
4.NF.B.3.D Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.				
Word problems: add/subtract fractions	Word problems: add/subtract fractions	1	Solving word problems involving both proper fractions and mixed numbers with the same denominator	• solve word problems involving adding and subtracting fractions with the same denominator • model and represent strategies, including using diagrams, and written representations

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Build fractions from unit fractions.

Quest	Learning Journey	Steps	Content	Detail
4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.				
Multiplying fractions by whole numbers				
4.NF.B.4.A Understand a fraction a/b as a multiple of 1/b.				
Fractions: multiples of unit fractions	Fractions: multiples of unit fractions	1	Representing a fraction a/b as a x 1/b	• represent a fraction a/b as a x 1/b
4.NF.B.4.B Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number.				
Multiply fraction by whole number, model	Multiply fractions by whole numbers using models	1	Multiplying unit fractions by whole numbers using models and diagrams	• apply and extend previous understandings of multiplication to multiply a unit fraction by a whole number • use repeated addition to represent and multiply unit fractions by whole numbers, e.g., 1/5 × 3 = 1/5 + 1/5 + 1/5 = 3/5 • develop a rule for multiplying unit fractions by whole numbers, e.g., multiply the numerator by the whole number • solve word problems involving multiplication of unit fractions by whole numbers, including area and length problems
		2	Multiplying proper fractions by whole numbers using models and diagrams	• apply and extend previous understandings of multiplication to multiply a fraction by a whole number supported by models and/or diagrams, e.g., 2/5 × 3 = 2/5 + 2/5 + 2/5 = 6/5 = 1 1/5 • use repeated addition to multiply simple fractions by whole numbers, e.g., 2/5 × 3 = 2/5 + 2/5 + 2/5 = 6/5 = 1 1/5 • develop a rule for multiplying simple fractions by whole numbers, e.g., 2/5 × 3 = 2 × 3 /5 = 6/5 = 1 1/5 • solve word problems involving multiplication of fractions by whole numbers, including area and length problems
4.NF.B.4.C Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.				
Word problems: multiplying fractions	Word problems: multiply fractions by whole numbers	1	Solving word problems involving multiplication of fractions by whole numbers using models and equations	• solve word problems involving multiplication of fractions by whole numbers using models

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Understand decimal notation for fractions, and compare decimal fractions.

Quest	Learning Journey	Steps	Content	Detail
4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.				
Add fractions: denominator of 10 and 100	Adding fractions with denominators of 10 and 100	1	Adding 2 fractions with respective denominators 10 and 100	• express a fraction with denominator 10 as an equivalent fraction with denominator 100 • add 2 fractions with respective denominators 10 and 100
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100.				
Representing fractions as decimals	Introducing decimal notation	1	Introducing decimal notation	• identify decimals in everyday use • understand that the decimal point is a mark that identifies the ones place, and indicates the change from whole numbers to parts of a whole • read decimals correctly • understand that any numbers after the decimal point represent part of a whole
	Introducing tenths	1	Introducing decimal tenths	• recognize that the place value system can be extended to tenths • represent tenths using concrete materials and written representations • recognize that tenths arise from dividing an object into 10 equal parts • recognize that tenths arise from dividing a one-digit number or quantity by 10 • identify decimals on a number line • represent decimals using models and place value manipulatives such as base ten blocks, place value chart, hundreds chart
		2	Connecting decimals to common fractions involving tenths	• understand the relationship between decimals and common fractions involving tenths • recognize and apply decimal notation to express whole numbers and tenths as decimals, e.g., 0.1 is the same as 1/10 • investigate equivalences using various methods, e.g., use a number line or a calculator to show that 1/2 is the same as 0.5 and 5/10
	Introducing hundredths	1	Introducing decimal hundredths	• recognize that the place value system can be extended to tenths and hundredths • recognize that hundredths arise when dividing an object by 100 and dividing tenths by 10 • state the place value of digits in decimal numbers of up to 2 decimal places • read decimals correctly
		2	Connecting decimals to common fractions involving hundredths	• understand the relationship between decimals and common fractions involving hundredths • recognize and apply decimal notation to express whole numbers and hundredths as decimals, e.g., 0.15 is the same as 15/100

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Understand decimal notation for fractions, and compare decimal fractions.

Quest	Learning Journey	Steps	Content	Detail
4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.				
Comparing decimals to hundredths	Compare and order decimals to hundredths	1	Comparing and ordering decimal tenths	• compare and order tenths using >, <, and =
		2	Comparing and ordering decimal hundredths	• compare numbers with the same number of decimal places up to 2 decimal places

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Understand the place value system.

Quest	Learning Journey	Steps	Content	Detail
5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.				
Understanding the place value system	Identifying the place value of a digit in a number	1	Naming the place value for a digit in a number	• name the place value for an underlined digit in a number • identify the value of an underlined digit in a number
	Understanding the place value system: powers of 10	1	Understanding how place values change by powers of 10 when moving left or right in a number	• understand how place values change by powers of 10 when moving left or right in a number
5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.				
Multiplying and dividing by powers of 10	Multiplying decimals by powers of 10	1	Multiplying decimals by 10	• use a place value chart to multiply decimals by 1000 • recognize that the digits move one place to the left • use zero as a place holder
		2	Multiplying decimals by 100	• recognize that the digits move two places to the left use zero as a place holder • use a place value chart to multiply decimals by 1000
		3	Multiplying decimals by 1000	• recognize that the digits move three places to the left • use zero as a place holder • use a place value chart to multiply decimals by 1000
		4	Multiplying decimals by 10, 100, 1000	• multiply decimals by 10, 100, 1000
	Dividing decimals by powers of 10	1	Dividing decimals by powers of 10	• use a place value chart to divide decimals by 100 • recognize that the digits move one place to the right • use zero as a place holder
		2	Dividing decimals by powers of 100	• use a place value chart to divide decimals by 100 • recognize that the digits move two places to the right • use zero as a place holder
		3	Dividing decimals by powers of 1000	• use a place value chart to divide decimals by 100 • recognize that the digits move three places to the right • use zero as a place holder
	Finding numbers before & after using powers of 10	1	Understanding the role of place value when increasing or decreasing a digit in a number	• find numbers 1, 10, 100, 1000, 10,000, 100,000 before or after a given number by applying place value knowledge • count in steps of powers of 10
	Writing numbers using powers of 10	1	Writing the value of a number in a specific place value with powers of 10	• write the value of a number in a specific place value with powers of 10

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Number & Operations in Base Ten
Understand the place value system.

Quest	Learning Journey	Steps	Content	Detail
5.NBT.A.3 Read, write, and compare decimals to thousandths.				
Decimals to thousandths				
5.NBT.A.3.A Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.				
Read and write decimals to thousandths	Reading and writing decimals to thousandths	1	Introducing decimal thousandths	• recognize that the place value system can be extended beyond hundredths • express thousandths as decimals • interpret decimal notation for thousandths, e.g., 0.123 = 123/1000 • state the place value of digits in decimal numbers of up to 3 decimal places • model thousandths using concrete materials • represent decimal fractions, e.g., as fractions (tenths, hundredths, and thousandths), using concrete materials and in diagrams
5.NBT.A.3.B Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.				
Comparing decimals to thousandths	Comparing and ordering decimals to thousandths	1	Comparing and ordering decimal fractions of up to 3 decimal places	• place decimal numbers of up to 3 decimal places on a number line between 0 and 1 • compare and order decimals with 3 decimal places using >, <, and = • compare and order decimals with a different number of decimal places, up to 3 decimal places
5.NBT.A.4 Use place value understanding to round decimals to any place.				
Rounding decimals	Rounding decimals	1	Round decimals to hundredths	• round decimal thousandths to the nearest hundredth
		2	Round decimals to tenths or hundredths	• round decimal thousandths to the nearest tenths or hundredths
		3	Rounding decimals to any place	• use place value understanding to round decimals to any place

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Number & Operations in Base Ten
Perform operations with multi-digit whole numbers and with decimals to hundredths.

Quest	Learning Journey	Steps	Content	Detail
5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.				
Multiply multi-digit numbers, algorithm	Multiplying multi-digit numbers, algorithm	1	Multiply multi-digit whole numbers using the standard algorithm	• apply the standard algorithm to multiply multi-digit whole numbers
		2	Selecting efficient strategies to multiply whole numbers of up to 4 digits by 1- and 2-digit numbers	• apply mental strategies • apply efficient use of formal algorithms • use digital technologies • estimate solutions to problems and check to justify solutions
5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				
Dividing multi-digit numbers	Using facts to divide 2-digit multiples of 10	1	Representing and using known facts to divide two 2-digit multiples of 10	• represent with models/diagrams and use known facts and place value understanding to divide two 2-digit multiples of 10, e.g., using the known fact of $60 \div 2 = 30$ to solve $60 \div 20$ as $(60 \div 2) \div 10$ • know that dividing by 10 shifts the digits 1 place to the right
		2	Representing and using known facts to divide two 2-digit multiples of 10 or 100	• represent with models/diagrams and use known facts and place value understanding to divide two 2-digit multiples of 10, e.g., using the known fact of $600 \div 2 = 300$ to solve $600 \div 20$ as $(600 \div 2) \div 10$ • know that dividing by 10 shifts the digits 1 place to the right and dividing by 100 shifts the digits 2 places to the right
	Multiplying and dividing 2-digit multiples of 10	1	Representing and using known facts to multiply or divide two 2-digit multiples of 10	• represent with models/diagrams and use known facts and place value understanding to multiply or divide two 2-digit multiples of 10, e.g., using the known fact of $60 \div 2 = 30$ to solve $60 \div 20$ as $(60 \div 2) \div 10$ • know that dividing by 10 shifts the digits 1 place to the right
		2	Representing and using known facts to multiply or divide two 2-digit multiples of 10 or 100	• represent with models/diagrams and use known facts and place value understanding to multiply or divide two 2-digit multiples of 10, e.g., using the known fact of $600 \div 2 = 300$ to solve $600 \div 20$ as $(600 \div 2) \div 10$ • know that dividing by 10 shifts the digits 1 place to the right and dividing by 100 shifts the digits 2 places to the right;- know that multiplying by 10 shifts the digits 1 place to the left and multiplying by 100 shifts the digits 2 places to the left

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Perform operations with multi-digit whole numbers and with decimals to hundredths.

Quest	Learning Journey	Steps	Content	Detail
5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				
Dividing multi-digit numbers	Multiplication/ division problems: multiples of 10	1	Using known facts to solve multiplication and division problems with multiples of 10 and 100	• use known facts and place value understanding to solve multiplication problems with multiples of 10 or 100, e.g., 3 x 6 = 18 so 3 x 600 = 1800 • use known facts and place value understanding to solve division problems with multiples of 10 or 100, e.g., 18 ÷ 6 = 3 so 1800 ÷ 600 = 3 • explain and justify the use of the strategy
	Dividing by subtracting partial products	1	Dividing by subtracting partial products	• divide numbers by subtracting partial products
	Dividing multi-digit numbers, algorithm	1	Dividing up to a 4-digit number by a 2-digit divisor using the division algorithm (extended/long)	• apply the written extended (long) algorithm to divide up to a 4-digit number by a 2-digit number, with and without remainders, with and without zeros in the answer
	Divide multi-digit numbers, whole number remainder	1	Dividing up to a 4-digit number by a 2-digit divisor (whole number remainder)	• divide up to a 4-digit number by a 2-digit divisor (whole number remainder)
5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.				
Operations with decimals	Adding decimals to hundredths, algorithm	1	Adding decimals to hundredths	• add a whole number and a decimal (to hundredths) • add 2 decimal numbers in tenths • add 2 decimals numbers in hundredths • add decimal numbers to 2 places (mixed place value)
	Subtracting decimals using mental strategies	1	Subtracting decimals using mental strategies	• select and apply efficient mental strategies to solve subtraction problems, including compensation, bridging to 1, using place value • record strategies using numbers, models, and diagrams • relate decimals to fractions to aid mental strategies • solve word problems using mental strategies, including problems involving measurement and money
	Subtracting decimals to hundredths, algorithm	1	Subtracting decimals to hundredths	• subtract a decimal up to the hundredths place from a whole number • subtract 2 decimal numbers in tenths • subtract 2 decimal numbers in hundredths • subtract 2 decimal numbers to 2 places (mixed place value)
	Multiplying decimals and whole numbers	1	Multiplying hundredths and whole numbers using mental strategies	• use efficient mental strategies to multiply hundredths and whole numbers

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations in Base Ten
Perform operations with multi-digit whole numbers and with decimals to hundredths.

Quest	Learning Journey	Steps	Content	Detail
5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.				
Operations with decimals	Multiplying decimals to hundredths, algorithm	1	Multiplying decimals up to 2 places using the standard algorithm	• multiply a whole number and a decimal up to hundredths • multiply 2 decimal numbers in tenths • multiply 2 decimal numbers in hundredths • multiply 2 decimal numbers up to 2 places
	Multiplying decimals using mental strategies	1	Multiplying decimals of up to 3 decimal places using mental strategies	• use mental strategies to multiply simple decimals by single-digit numbers, e.g., 3.5 x 2 • multiply decimals of up to 3 decimal places by whole numbers of up to 2 digits, with and without the use of digital technologies, e.g., 'I measured 3 desks. Each desk was 1.25 m in length, so the total length is 3 × 1.25 = 3.75 m' • solve word problems involving the multiplication of decimals, including those involving money • use estimation and rounding to check the reasonableness of answers when multiplying decimals
	Multiplicative relationships with decimals	1	Relating multiplicative relationships using decimals	• describe multiplicative relationships between quantities by using decimals, e.g., 'I have 1.5 times as many plums as you'
	Divide whole numbers & decimals, mental strategies	1	Dividing whole numbers and decimals of up to 2 decimal places using mental strategies	• divide decimals by a one-digit whole number where the result is a terminating decimal, e.g., 5.25 ÷ 5 = 1.05 • solve word problems involving the division of decimals, including those involving money • use estimation and rounding to check the reasonableness of answers when dividing decimals
	Dividing whole numbers and decimals, algorithm	1	Dividing whole numbers and decimals up to 2 places using the standard algorithm	• divide whole numbers by decimals up to 2 places • divide a decimal number up to hundredths by another decimal number up to hundredths

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Number & Operations—Fractions
Use equivalent fractions as a strategy to add and subtract fractions.

Quest	Learning Journey	Steps	Content	Detail
5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.				
Adding and subtracting fractions	Adding fractions and mixed numbers	1	Adding fractions and mixed numbers with unrelated denominators	• add fractions, including mixed numbers, where the denominators are unrelated by finding common denominators • model and represent strategies, including using diagrams and written representations • convert an answer that is an improper fraction to a mixed number • use knowledge of equivalence to simplify answers when adding fractions • recognize that improper fractions may sometimes make calculations involving mixed numbers easier
	Subtracting fractions and mixed numbers	1	Subtracting fractions and mixed numbers with unrelated denominators	• subtract fractions, including mixed numbers, where the denominators are unrelated by finding common denominators • model and represent strategies, including using diagrams and written representations • convert an answer that is an improper fraction to a mixed number • use knowledge of equivalence to simplify answers when subtracting fractions • recognize that improper fractions may sometimes make calculations involving mixed numbers easier
	Adding and subtracting fractions and mixed numbers	1	Adding and subtracting fractions and mixed numbers with unrelated denominators	• add and subtract fractions, including mixed numbers, where the denominators are unrelated by finding common denominators • model and represent strategies, including using diagrams and written representations • convert an answer that is an improper fraction to a mixed number • use knowledge of equivalence to simplify answers when adding and subtracting fractions • recognize that improper fractions may sometimes make calculations involving mixed numbers easier
	Adding fractions, proper and improper	1	Adding proper fractions with unlike denominators	• add proper fractions with unlike denominators • explain why there must be a common denominator in order to add fractions
		2	Adding improper fractions with unlike denominators	• add improper fractions with unlike denominators • add improper fractions with unlike denominators expressing answers as a mixed number
	Adding mixed numbers	1	Adding mixed numbers with unlike denominators	• add mixed numbers with unlike denominators

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations—Fractions
Use equivalent fractions as a strategy to add and subtract fractions.

Quest	Learning Journey	Steps	Content	Detail
5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
Adding and subtracting fractions	Subtracting fractions, proper and improper	1	Subtracting proper fractions with unlike denominators	• subtract proper fractions with unlike denominators • explain why there must be a common denominator in order to subtract fractions
		2	Subtracting improper fractions with unlike denominators	• subtract improper fractions with unlike denominators • subtract improper fractions with unlike denominators expressing answers as a mixed number
	Subtracting mixed numbers	1	Subtracting mixed numbers with unlike denominators	• subtract mixed numbers with unlike denominators
5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.**
Add/subtract fraction word problems	Solving word problems: fractions and mixed numbers	1	Solving word problems involving fractions and mixed numbers with the unrelated denominators	• solve word problems involving the addition and subtraction of fractions with unrelated denominators
	Solving fraction word problems	1	Solving word problems involving non-unit fractions	• find the whole given the non-unit fraction of a set • solve word problems in different contexts, e.g., measurement • solve word problems involving fractions with different denominators e.g., 2/5 of the children have blue eyes, 2/6 have green eyes, if there are 30 children altogether, how many children have brown eyes?

Apply and extend previous understandings of multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
5.NF.B.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.**
Interpreting fractions as division	Interpreting fractions as division	1	Interpreting fractions as division	• interpret a fraction as division of the numerator by the denominator (no decimals) • solve word problems involving division of whole numbers, using models to represent the problem, e.g., 3 pizzas shared equally among 4 people

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations—Fractions
Apply and extend previous understandings of multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.				
Multiplying fractions				
5.NF.B.4A Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b.				
Understanding multiplying fractions	Multiplying a fraction by a whole number	1	Multiplying proper or improper fractions by whole numbers using models and diagrams	• apply and extend previous understandings of multiplication to multiply a fraction by a whole number supported by models and/or diagrams, e.g., 2/5 × 3 = 2/5 + 2/5 + 2/5 = 6/5 = 1 1/5 • apply and extend previous understandings of multiplication to multiply an improper fraction by a whole number supported by models and/or diagrams, e.g., 6/5 × 3 = 6/5 + 6/5 + 6/5 = 18/5 = 3 3/5 • develop a rule for multiplying fractions by whole numbers e.g., multiply the numerator by the whole number • solve word problems involving multiplication of fractions by whole numbers, including area and length problems
	Multiplying a fraction by a fraction	1	Multiplying 2 proper fractions	• multiply 2 proper fractions using written methods
5.NF.B.4.B Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.				
Area of a rectangle, fractional sides	Find the area of a rectangle with fractional sides	1	Finding the area of a rectangle with fractional side lengths by tiling	• tile a rectangle with unit squares of the appropriate unit fraction of the side lengths;- recognize that the area is the same as would be found by multiplying the side lengths • multiply fractional side lengths to find areas of rectangles • represent fraction products as rectangular areas
5.NF.B.5 Interpret multiplication as scaling (resizing).				
Interpreting multiplication as scaling				
5.NF.B.5.A Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.				
Comparing products and factors	Comparing products and factors	1	Comparing the size of a product to the size of 1 factor based on the size of the other factor, without performing the indicated multiplication	• compare the size of a product to the size of 1 factor based on the size of the other factor, without performing the indicated multiplication

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations—Fractions
Apply and extend previous understandings of multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
5.NF.B.5.B Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n × a)/(n × b) to the effect of multiplying a/b by 1.				
Effects of multiplying fractions	Interpreting multiplying fractions as scaling	1	Interpreting multiplication of proper fractions as scaling	• explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case) • explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number • relate the principle of fraction equivalence a/b = (n × a)/(n × b) to the effect of multiplying a/b by 1
5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers.				
Multiplying fractions word problems	Word problems: multiply fractions & mixed numbers	1	Solving real-world problems involving multiplication of fractions and mixed numbers	• solve real-world problems involving multiplication of fractions and mixed numbers
5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.				
Dividing fractions and whole numbers				
5.NF.B.7.A Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.				
Dividing unit fractions by whole numbers	Dividing unit fractions by whole numbers, models	1	Dividing a unit fraction by a non-zero whole number using models or diagrams	• interpret division of a unit fraction by a non-zero whole number and compute such quotients
	Dividing unit fractions by whole numbers	1	Dividing a unit fraction by a non-zero whole number	• divide a unit fraction by a non-zero whole number
5.NF.B.7.B Interpret division of a whole number by a unit fraction, and compute such quotients.				
Dividing whole numbers by unit fractions	Dividing whole numbers by unit fractions, models	1	Dividing a whole number by unit fraction using models and diagrams	• interpret division of a whole number by a unit fraction and compute such quotients
	Dividing whole numbers by unit fractions	1	Dividing a whole number by a unit fraction	• divide a whole number by a unit fraction

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Number & Operations—Fractions
Apply and extend previous understandings of multiplication and division.

Quest	Learning Journey	Steps	Content	Detail
5.NF.B.7.C Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.				
Dividing unit fractions word problems	Word problems: divide unit fractions/whole numbers	1	Solving real-world problems involving division of whole numbers by unit fractions.	• solve real-world problems involving division of whole numbers by unit fractions
		2	Solving real-world problems involving division of unit fractions by non-zero whole numbers	• solve real-world problems involving division of unit fractions by non-zero whole numbers

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Solve problems involving measurement and estimation.

Quest	Learning Journey	Steps	Content	Detail
3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes.				
Tell and write time to the minute	Telling time to the minute, digital and analog	1	Telling time to the minute (digital)	• read time on 12-hour digital clocks to the minute using the terms 'o'clock', 'past' and 'to', including 'half-past', 'quarter past' and 'quarter to' and write in words • record times on analog clocks to the minute in 12-hour digital format • position or draw the hands on an analog clock to show time to the minute where the time is given in 12-hour digital format • connect 12-hour digital displays for times the minute to their corresponding display on an analog clock
		2	Telling time to the minute (analog)	• read time on analog clocks to the minute using the terms 'o'clock', 'past' and 'to', including 'half-past', 'quarter past' and 'quarter to' • observe and describe the position or draw of the hands of an analog clock when reading time to the minute, including the hour hand, minute hand and second hand • position or draw the hands on an analog clock to show time to the minute where the time is given using the terms 'o'clock', 'past' and 'to', including 'half-past', 'quarter past' and 'quarter to'
	Calculating elapsed time	1	Calculating elapsed time within one unit of measurement	• estimate and determine elapsed time in hours only • estimate and determine elapsed time in minutes only, without crossing an hour • estimate and determine elapsed time in minutes only, including crossing an hour
	Using timetables	1	Using timetables (12-hour time)	• use real-world timetables (12-hour time only) to determine arrival time given the desired departure time, including when the exact departure time is not listed exactly in the timetable, i.e., needing to use an earlier departure time • use real-world timetables (12-hour time only) to determine departure time given the desired arrival time, including when the arrival time is not listed exactly in the timetable • create timetables using given information

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Measurement & Data
Solve problems involving measurement and estimation.

Quest	Learning Journey	Steps	Content	Detail
3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units to represent the problem.			
Introducing formal units for volume and capacity: liters	Introducing volume/capacity	1	Introducing formal units for volume	• recognize and explain the need for formal units to measure volume and capacity • develop a personal reference for one liter and fractions of 1 liter (quarters and halves);- relate the liter to familiar everyday containers, e.g., milk cartons • recognize that one-liter containers can be a variety of shapes • record volumes and capacities using the abbreviation for liters (L)
Liquid volume and mass	Estimating, comparing and measuring in liters	1	Estimating, comparing, and measuring in liters	• estimate and measure capacities to the nearest liter • compare and order 2 or more containers by capacity measured in liters, including the capacity of commercially packaged objects whose capacity is stated in liters • record volumes and capacities using the abbreviation for liters (L)
	Liquid volume: milliliters	1	Introducing formal units for volume and capacity: milliliters	• recognize the need for a formal unit smaller than the liter to measure volume and capacity • recognize that there are 1000 milliliters in 1 liter, i.e., 1000 milliliters = 1 liter • relate the milliliter to familiar everyday containers and familiar informal units, e.g., 250 mL fruit juice containers, 1 teaspoon is approximately 5 mL
		2	Measuring with milliliters to the nearest 100 mL	• use the milliliter as a unit to measure volume and capacity, using a device calibrated in milliliters (read to the nearest 100mL with every 100mL or every other 100mL marked) • record volumes and capacities using the abbreviation for milliliters (mL) • estimate the capacity of a container in milliliters and check by measuring (measure to the nearest 100 mL with every 100 mL or every other 100 mL marked) • compare and order the capacities of 2 or more containers measured in milliliters

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Solve problems involving measurement and estimation.

Quest	Learning Journey	Steps	Content	Detail
3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units to represent the problem.**
Liquid volume and mass	Solving word problems involving liquid volume	1	Solving word problems involving liquid volume	• use the 4 operations to solve one-step word problems involving liquid volume given in the same units
	Mass: kilograms	1	Introducing formal units for mass: the kilogram	• establish the need for formal units to measure mass and introduce the kilogram • develop a sense of the mass of 1 kilogram and identify objects that have mass 'about 1 kilogram', 'less than 1 kilogram', 'greater than 1 kilogram', e.g., a liter of milk is about 1 kilogram, a standard pack of flour is 1 kilogram • identify everyday situations where kilograms are an appropriate unit for measuring the mass • introduce the abbreviation 'kg' for recording mass in kilograms
		2	Measuring mass in kilograms	• compare and order 2 or more objects by mass measured to the nearest kilogram using carried scales • estimate the number of objects that have a total mass of 1 kilogram and check by measuring • estimate mass using a personal reference for a kilogram • record mass using the abbreviation 'kg' • compare masses using uniform informal units and the symbols >, =, < • compare masses using simple scaling by integers, e.g., 'five times as heavy'
	Mass: grams	1	Introducing formal units for mass: the gram	• establish the need for a smaller unit of mass and introduce the gram, including that 1000 grams = 1 kilogram • develop a sense of the mass of standard everyday objects in grams, e.g., an egg is about 50 grams • identify everyday situations where grams are an appropriate unit for measuring the mass • introduce the abbreviation 'g' for recording mass in grams and record masses • calculate the number of grams in a whole number of kilograms • interpret simple fractions (¼, ½, ¾) of a kilogram and relate these to the number of grams
		2	Measuring in grams	• estimate mass using personal references for grams and 'guess and check' • measure mass in grams by using and interpreting varied scales and images of scales • record mass in grams using the appropriate abbreviation (g)

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Solve problems involving measurement and estimation.

Quest	Learning Journey	Steps	Content	Detail
3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units to represent the problem.				
Liquid volume and mass	Mass: measuring in grams and kilograms	1	Measuring in grams and kilograms	• estimate mass using personal references for grams and kilograms • choose appropriate standard units to estimate and measure (g/kg) • measure mass in grams and kilograms by using and interpreting varied scales • record mass in grams, kilograms, and mixed units using the appropriate abbreviations (g), (kg), e.g., 5 kg and 500 g
	Solving 1-step word problems involving mass	1	Solving one-step word problems involving mass	• use the 4 operations to solve one-step word problems involving mass given in the same units

Represent and interpret data.

Quest	Learning Journey	Steps	Content	Detail
3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.				
Scaled picture and bar graphs	Reading and representing data: scaled picture graph	1	Reading data in a picture graph with a scale of 1, 2, 5, or 10	• ask and answer one step and two step questions, e.g., 'how many more students like reading than art?';- • make conclusions about data presented in a column graph, e.g., 'Football is the most popular sport for students in Year 3 at our school' • compare column graphs with picture graphs • evaluate simple statements made by others relating to data in a picture graph
			Representing data in a bar graph with a scale of 1, 2, 5, or 10	• construct a vertical or horizontal bar graph using grid paper for support, where appropriate use a scale of e.g., 2, 5, or 10 to 1 • use graphing software to enter data and create bar graphs that represent data • mark equal spaces on axes, name and label axes, and choose appropriate titles for bar graphs;- use the terms 'horizontal axis', 'vertical axis', and 'axes' appropriately
		2	Representing data in a picture graph with a scale of 1, 2, 5, or 10	• solve comparison, sum and difference (one-step and two-step problems) problems related to the data display;- make conclusions • construct vertical and horizontal picture graphs with equal spacing • choose an appropriate title and label the axis • choose an appropriate picture or symbol for a picture graph and state the key used (1, 2, 5, or 10)

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Represent and interpret data.

Quest	Learning Journey	Steps	Content	Detail
3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.				
Scaled picture and bar graphs	Reading and representing data: scaled bar graph	1	Reading data in a bar graph with a scale of 1, 2, 5, or 10	• ask and answer one-step and two-step questions, e.g., 'How many more students like reading than art?' • make conclusions about data presented in a bar graph, e.g., 'Football is the most popular sport for students in Year 3 at our school' • compare bar graphs with picture graphs • evaluate simple statements made by others relating to data in a bar graph
		2	Representing data in a bar graph with a scale of 1, 2, 5, or 10	• ask and answer one-step and two-step questions, e.g., 'How many more students like reading than art?';- make conclusions about data presented in a bar graph, e.g., 'Football is the most popular sport for students in Year 3 at our school'
3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.				
Representing and reading line plots	Representing and reading line plots	1	Representing and reading line plots with both whole number and fractional data (halves or quarters)	• measure lengths using rulers marked with halves and fourths of an inch;- measure a single object multiple times to the nearest whole inch, half inch and quarter inch • show the data by making a line plot, where the horizontal scale is marked off in appropriate units - whole numbers, halves, or quarters • compare variations in the data displays

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Quest	Learning Journey	Steps	Content	Detail
3.MD.C.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.				
			Introducing area	
3.MD.C.5.A A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.				
Estimating area with tiling	Estimating area with tiling	1	Measuring area using informal units	• compare use of non-uniform units with uniform units to measure area • tile units to completely cover an area • consider effect of gaps and overlaps when measuring area • recognize iteration and structure in arrangement of uniform informal units to measure the area • identify features that determine whether chosen units will be good units to measure area;- i.e., units must be the same size, units need to tile without gaps or overlaps • estimate areas in uniform informal units
3.MD.C.5.B A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.				
Measuring area with unit squares	Measuring area with unit squares	1	Measuring and estimating areas of rectangles using a square unit	• establish usefulness of using a square unit to find an area as it allows for an array structure and does not have gaps or overlaps • compare the same area measured using different sized square unit • understand that the larger the unit square, the smaller the number of units needed and likewise the smaller the square unit, the larger the number of units neede
3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).				
Measuring area with formal units	Introducing formal units for area	1	Introducing formal units for area: the square centimeter	• establish the need for a formal unit to measure area and introduce square centimeters • develop a sense of the area of 1 square centimeter and identify surfaces that have area 'about 1 square centimeter', 'less than 1 square centimeter' and 'greater than 1 square centimeter' • identify everyday situations where square centimeters are an appropriate unit for measuring area • introduce the abbreviation cm² for recording area in square centimeters
		2	Introducing formal units for area: the square meter	• recognize the need for a larger formal unit to measure area and introduce square meters • develop a sense of the area of 1 square meter and identify surfaces that have area 'about 1 square meter', 'less than 1 square meter' and 'greater than 1 square meter' • identify everyday situations where square meters are an appropriate unit for measuring the area, e.g., floor of a room • recognize that a square meter need not be square in shape, e.g., cut a piece of cardboard that is 1 meter by 1 meter in half and join the shorter ends to make an area that is 2 meters by half a meter • introduce the abbreviation m² for measuring area in square meters

Measurement & Data

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Quest	Learning Journey	Steps	Content	Detail
3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).				
Measuring area with formal units	Introducing formal units for area	3	Introducing formal units for area: the square inch	• develop a sense of the area of 1 square inch and identify surfaces that have area 'about 1 square inch', 'less than 1 square inch', and 'greater than 1 square inch' • identify everyday situations where square inches are an appropriate unit for measuring area • introduce the abbreviations ' square in', 'sq in' and 'in²' for recording area in square inches • recognize the need for a larger formal unit to measure area and introduce square feet
		4	Introducing formal units for area: the square foot	• develop a sense of the area of 1 square foot and identify surfaces that have area 'about 1 square foot', 'less than 1 square foot' and 'greater than 1 square foot' • identify everyday situations where square feet are an appropriate unit for measuring the area, e.g., floor of a room • recognize that a square foot need not be square in shape, e.g., cut a piece of cardboard that is 1 foot by 1 foot in half and join the shorter ends to make an area that is 2 feet by half a foot
		5	Introducing formal units for area: the square foot	• introduce the abbreviations 'square ft', 'sq ft', and 'ft²' for recording area in square feet
	Measuring the area of rectangles: square cm/m	1	Estimating and measuring areas of rectangles using efficient strategies and counting in square centimeters or meters	• measure the area of rectangles (including squares) using square centimeters and/or square meters (both tiling and using grid overlay) using whole number side lengths only • estimate areas of rectangles (including squares) in square centimeters and/or square meters and then check by measuring • develop efficient strategies for counting square centimeters/meters when measuring areas of rectangles • draw possible rectangles on a grid to represent a given whole number rectangular area
	Measuring the area of rectangles: square in/ft	1	Estimating and measuring areas of rectangles using efficient strategies and counting in square inches or feet	• measure the area of rectangles (including squares) using square inches and/or square feet (both tiling and using grid overlay) using whole number side lengths only • estimate areas of rectangles (including squares) in square inches and/or square feet and then check by measuring • develop efficient strategies for counting square inches/feet when measuring areas of rectangles • draw possible rectangles on a grid to represent a given whole-number rectangular area

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Quest	Learning Journey	Steps	Content	Detail
3.MD.C.7 Relate area to the operations of multiplication and addition.				
Relating area to multiplying and adding				
3.MD.C.7.A Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.				
Finding the area with repeated addition	Finding the area of rectangles, repeated addition	1	Developing an additive formula for area of a rectangle	• connect arrays with side lengths through repeated addition leading to multiplication
3.MD.C.7.B Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.				
Solving area problems: multiplication	Solving area problems using multiplication	1	Developing a multiplicative formula for area of a rectangle using metric units	• connect the area of a rectangle to the multiplication of its side lengths and develop a formula (in words) for the area of a rectangle, e.g., Area of rectangle = length x width • calculate the area of a rectangle by multiplying the length and width of the rectangle • calculate a side length of the rectangle given its area and one other side length • explain methods for finding the area of a square as a type of rectangle;- connect multiplying equal sides to the concept of square numbers • connect the area of a rectangle to the multiplication of its side lengths and develop a formula (in words) for the area of a rectangle, e.g., Area of rectangle = length x width
		2	Developing a multiplicative formula for area of a rectangle using customary units	• calculate the area of a rectangle by multiplying the length and width of the rectangle • calculate a side length of the rectangle given its area and one other side length • explain methods for finding the area of a square as a type of rectangle;- connect multiplying equal sides to the concept of square numbers
3.MD.C.7.C Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.				
Finding the area using area models	Finding the area of rectangles, area models	1	Using area models and the distributive property to find the area of a rectangle	• use area models and the distributive property to find the area of a rectangle
3.MD.C.7.D Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.				
Finding the area of rectilinear figures	Finding the area of rectilinear figures	1	Measuring areas of rectilinear figures by decomposing into rectangles and counting units	• recognize area as additive • decompose rectilinear figures into rectangles to find their area by tiling or using a grid overlay

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Geometric measurement: recognize perimeter.

Quest	Learning Journey	Steps	Content	Detail
3.MD.D.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
Solving perimeter problems	Finding the perimeter of squares and rectangles	1	Comparing areas and perimeters of rectangles	• construct different rectangles with the same area and compare their perimeters • construct different rectangles with the same perimeters and compare their areas • investigate the relationship between the side lengths of a rectangle and its perimeter and area • investigate the relationship between the side lengths of a square and its perimeter and area
	Relating perimeter and area	1	Solving problems relating to perimeter and area of rectangles and squares	• pose and solve problems that require the distinction between perimeter and area • draw a number of rectangles of differing areas with the same perimeter;- compare with squares • determine that only one square is possible if given the area of a square;- compare with rectangles • investigate what happens to the area of the shape if the length of one pair of opposite sides of the shape are doubled or halved
	Introducing perimeter	1	Introducing perimeter	• use the term 'perimeter' to describe the total distance around a two-dimensional shape • estimate and measure the perimeters of two-dimensional shapes • describe when a perimeter measurement might be used in everyday situations
	Finding the perimeter of rectangles	1	Calculating the perimeters of rectangles	• use the term 'dimensions' to describe the 'lengths' and 'widths' of rectangles and squares • measure and calculate the perimeter of a large rectangular section of the school • recognize that rectangles with the same perimeter may have different dimensions • recognize that rectangles with dimensions given in different units may have the same perimeter • explore different methods of finding the perimeter of rectangles • create a rule to find the perimeter of any rectangle
	Finding a missing side length given the perimeter	1	Calculating the side length of a rectangle given the perimeter	• find the length of 1 unknown side of a rectangle given the perimeter • find possible length combinations of 2 unknown sides of a rectangle given the perimeter
	Finding the perimeter of polygons	1	Calculating the perimeters of regular polygons	• explain the relationship between the lengths of the sides and the perimeters for polygons (including equilateral triangles and squares) • record calculations used to find the perimeters of two-dimensional shapes • find the length of 1 unknown side of a shape given the perimeter

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Solve problems involving measurement and conversion of measurements.

Quest	Learning Journey	Steps	Content	Detail
4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.				
Converting units of measure	Units of length: mm/cm/m/km	1	Converting between meters and centimeters (whole numbers only)	• describe 1 m as 100 cm • convert between meters and centimeters using whole numbers, e.g., 3 m is the same as 300 cm • record measurement equivalents in a table • explain the relationship between the size of a unit and the number of units needed
		2	Converting between centimeters and millimeters (whole numbers only)	• describe 1 cm as 10 mm • convert between centimeters and millimeters using whole numbers • record measurement equivalents in a table • explain the relationship between the size of a unit and the number of units needed
		3	Converting between kilometers and meters (whole numbers only)	• convert between kilometers and meters using whole numbers
	Units of mass: g/kg and oz/lb	1	Converting between grams and kilograms (whole numbers only)	• convert between grams and kilograms using whole numbers and record measurement equivalents in a two-column table • convert between mass written in grams and mixed units (kg and g), e.g., 1250g = 1 kg 250g or 7kg 320g = 7320g
		2	Converting between pounds and ounces (whole numbers only)	• convert between pounds and ounces using whole numbers
	Units of time: sec/min/h and day/week/year	1	Converting between units of time (multiplicative conversions only)	• calculate the number of seconds in a whole number of minutes • calculate the number of minutes in a whole number of hours • calculate the number of days in a whole number of weeks • calculate the number of months in a whole number of years • solve problems involving conversion between units of time
	Units of volume and capacity: mL/L	1	Converting between units of volume and capacity (whole numbers only)	• convert between milliliters and liters using whole numbers and record measurement equivalents in a two-column table

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Solve problems involving measurement and conversion of measurements.

Quest	Learning Journey	Steps	Content	Detail
4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.**			
Word problems: units of measure	Length word problems	1	Solving word problems involving lengths and distances	• use the 4 operations to solve word problems involving distances including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit
		2	Representing length measurements on diagrams using scale	• represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale
	Mass word problems	1	Solving word problems involving mass	• use the 4 operations to solve word problems involving mass, including problems involving simple fractions or decimals and problems that require expressing measurements given in a larger unit in terms of a smaller unit
		2	Solving 2-step word problems involving mass	• use the 4 operations to solve 2-step word problems involving mass, including problems involving simple fractions or decimals and problems that require expressing measurements given in a larger unit in terms of a smaller unit
	Elapsed time word problems	1	Solving problems relating to elapsed time involving the four operations (to five minutes)	• calculate the number of seconds in a whole number of minutes
	Volume and capacity word problems	1	Solving word problems involving volume and capacity	• calculate the number of minutes in a whole number of hours
	Money word problems	1	Using money: Addition and subtraction problems United States	• calculate the number of days in a whole number of weeks • calculate the number of months in a whole number of years
		2	Using money: Multiplication and division problems (U.S. currency)	• solve problems involving conversion between units of time • convert between milliliters and liters using whole numbers and record measurement equivalents in a two-column table

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Measurement & Data
Solve problems involving measurement and conversion of measurements.

Quest	Learning Journey	Steps	Content	Detail
4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.				
Applying area and perimeter formulas	Finding the area of a rectangle, formula	1	Applying the formula for the area of a rectangle (metric and customary units)	• apply the formula for area of a rectangle to find the area of rectangles given 2 side lengths measured in the same units (metric and customary units) • find the width or length of a rectangle given the area and the measure of the other side
		2	Solving word problems involving the area of a rectangle (metric and customary units)	• solve word problems involving the area of a rectangle (metric and customary units)
	Finding the perimeter of a rectangle, formula	1	Applying the formula for the perimeter of a rectangle (metric and customary units)	• apply the formula for perimeter of a rectangle to find the perimeter of rectangles given 2 side lengths measured in the same units (metric and customary units) • find the width or length of a rectangle given the perimeter and the measure of the other side
		2	Solving word problems involving the perimeter of a rectangle (metric and customary units)	• solve word problems involving the perimeter of a rectangle (metric and customary units)

Represent and interpret data.

Quest	Learning Journey	Steps	Content	Detail
4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.				
Fractions on a line plot	Fractions on a line plot	1	Representing and interpreting fraction measurements on a line plot	• make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8) • solve problems involving addition and subtraction of fractions by using information presented in line plots

Measurement & Data
Geometric measurement: understand concepts of angle and measure angles.

Quest	Learning Journey	Steps	Content	Detail
4.MD.C.5.A An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.				
Angle measurements in a circle	Using a circular protractor to measure angles	1	Using a circular protractor to understand a one-degree angle as 1/360 of a turn	• use estimation to check the reasonableness of solutions to problems involving purchases and calculation of change (U.S. currency)
4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.				
Measuring and estimating angles	Measuring and estimating angles	1	Measuring and estimating angles of up to 180° in degrees	• apply the formula for area of a rectangle to find the area of rectangles given 2 side lengths measured in the same units (metric and customary units) • solve word problems involving the area of a rectangle (metric and customary units)
4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems.				
Solving problems with adjacent angles	Solving problems with adjacent angles	1	Introducing adjacent angles	• apply the formula for perimeter of a rectangle to find the perimeter of rectangles given 2 side lengths measured in the same units (metric and customary units) • find the width or length of a rectangle given the perimeter and the measure of the other side
		2	Exploring adjacent angles that form a right angle	• solve word problems involving the perimeter of a rectangle (metric and customary units) • make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8)
		3	Exploring adjacent angles that form a straight angle	• solve problems involving addition and subtraction of fractions by using information presented in line plots • explore the relationship between angles that form a straight angle

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Convert like measurement units within a given measurement system.

Quest	Learning Journey	Steps	Content	Detail
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
Converting measurement units	Converting between standard metric units of length	1	Converting between standard metric units of length to 1 decimal place	• understand the meaning of metric prefixes, e.g., kilo-, centi-, and milli- • convert between centimeters and meters and vice versa • convert between centimeters and millimeters and vice versa • convert between meters and kilometers and vice versa • convert among millimeters, centimeters, meters, and kilometers • explain and use the relationship between the size of a unit and the number of units needed to assist in determining whether multiplication or division is required when converting between units
	Converting between standard metric units of mass	1	Converting between standard metric units of mass to 1 decimal place	• understand the meaning of metric prefixes, e.g., kilo-, centi-, milli- • convert between grams and kilograms and vice versa • convert between kilograms and tonnes and vice versa • convert among grams, kilograms and tons
	Converting metric units of volume and capacity	1	Converting metric units of volume and capacity when the conversion factor is given	• convert metric units of volume and capacity when conversion factor is given
	Converting between customary units of length	1	Converting between customary units of length	• convert customary units of volume and capacity when the conversion factor is given
	Converting customary units of volume and capacity	1	Converting customary units of volume and capacity when the conversion factor is given	• use conversions in real-world multi-step problems
	Converting between customary units of mass	1	Converting between customary units of mass	• use operations on fractions for this grade to solve problems involving information presented in line plots
	Word problems: measurement conversions	1	Using conversions in real-world multi-step problems	• Understanding that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Measurement & Data
Represent and interpret data.

Quest	Learning Journey	Steps	Content	Detail
5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.				
Fraction problems: line plots	Represent and interpret measurements: line plots	1	Representing and interpreting measurements on a line plot, including fractional amounts	• understand that a solid figure without gaps or overlaps with n unit cubes has a volume of n cubic units • measure volumes by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units

Geometric measurement: understand concepts of volume.

Quest	Learning Journey	Steps	Content	Detail
5.MD.C.3.A A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.				
	Volume using cubic units	1	Understanding the concept of cubic units	• explain the advantages and disadvantages of using cubic-centimeter blocks as a unit to measure volume
5.MD.C.3.B A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.				
	Volume using cubic units	2	Understanding that a solid figure without gaps or overlaps with n unit cubes has a volume of n cubic units	• describe arrangements of cubic-centimeter blocks in containers in terms of layers
5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.				
Measuring volume with unit cubes	Measuring volume: unit cubes and cubic centimeters	1	Using unit cubes to measure volume	• connect the layers of blocks with multiplying the dimensions
		2	Using cubic centimeters to measure volume	• describe rectangular prisms in terms of layers • describe rectangular prisms in terms of layers • use repeated addition to find the volumes of rectangular prisms • establish the relationship between the number of cubes in 1 layer, the number of layers, and the volume of a rectangular prism

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Measurement & Data
Geometric measurement: understand concepts of volume.

Quest	Learning Journey	Steps	Content	Detail
5.MD.C.5.A Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.				
Volume: rectangular prisms	Volume: additive and multiplicative strategies	1	Calculating the volumes of rectangular prisms using additive and multiplicative strategies	• record, using words, the method for finding the volumes of rectangular prisms • calculate the volumes of rectangular prisms in cubic centimeters and cubic meters including calculating the volume given the net for the shape • record calculations used to find the volumes of rectangular prisms • apply the formulas $V = l \times w \times h$ and $V = b \times h$ find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems • find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts
5.MD.C.5.B Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.				
Volume formulas: rectangular prism	Applying volume formulas for rectangular prisms	1	Solve problems involving the volume of a rectangular prism	
5.MD.C.5.C Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.				
Volume: composite rectangular prisms	Volume of composite rectangular prisms	1	Find the volume of composite rectangular prisms using additive strategies	

NWEA alignment
RIT SCORE BAND 189 - 200
Understanding Practice and Fluency (UPF)

Mathletics

Geometry
Reason with shapes and their attributes.

Quest	Learning Journey	Steps	Content	Detail
3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.**
Understanding shapes and their attributes	Sorting and naming quadrilaterals	1	Sorting and naming quadrilaterals	• sort the special quadrilaterals;- explain the attribute used to sort, e.g., angle, parallel sides, side lengths;- classify quadrilaterals into categories and sub-categories • identify and name the special quadrilaterals in different orientations, including parallelograms, rectangles, rhombuses, squares, trapezoids, and kites • explore and explain the given names of the quadrilaterals, e.g., parallelogram
		2	Recognizing quadrilaterals that are not rhombuses, rectangles, and squares	• recognize quadrilaterals that are not rhombuses, rectangles, and squares
	Comparing and describing two-dimensional shapes	1	Comparing and describing two-dimensional shapes, including special quadrilaterals	• identify and name a shape given a description of its features • sort two-dimensional shapes using given attributes, e.g., number of sides, number of parallel sides • compare similarities and differences between two-dimensional shapes, including the special quadrilaterals
			Recognizing quadrilaterals that are not rhombuses, rectangles, and squares	• draw quadrilaterals that are not rhombuses, rectangles, and squares
3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.
Partitioning shapes	Partition shapes into parts with equal areas	1	Partitioning shapes into parts with equal areas	• partition shapes into parts with equal areas • express the area of each part as a unit fraction of the whole

NWEA alignment
RIT SCORE BAND 201 - 210
Understanding Practice and Fluency (UPF)

Geometry
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Quest	Learning Journey	Steps	Content	Detail
4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.				
Spatial features in 2D figures	Classifying angles	1	Classifying angles in relation to a right angle	• classify angles as 'less than a right angle', 'about the same as a right angle', 'greater than a right angle'
		2	Classifying angles as acute, right, or obtuse	• identify and name angles as acute, right, or obtuse • categorize angles as acute, right, or obtuse • draw and create angles of a given size: acute, right, obtuse (no protractors)
	Labeling points and lines	1	Labeling points and lines	• define, name, label, and draw points, lines, and line segments • define, name, label, and draw lines using capital letters
	Identifying spatial features in 2D shapes	1	Identifying spatial features in two-dimensional shapes	• identify points, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines
4.G.A.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.				
Classifying 2D figures	Classifying plane shapes by their spatial features	1	Classifying plane shapes by their spatial features	• classify plane shapes by the nature and number of sides, angles, and symmetry;- including parallel/perpendicular sides, right, obtuse, acute angles
	Classifying triangles by their sides and angles	1	Classifying triangles by their sides and angles	• identify and name right, equilateral, isosceles, and scalene triangles • compare and describe features of the sides and angles of equilateral, isosceles, and scalene triangles • identify right triangles as well as scalene or isosceles • explore, by measurement, side and angle properties of equilateral, isosceles, and scalene triangles
4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.				
Lines of symmetry	Lines of symmetry	1	Recognizing line symmetry of shapes	• define the line of symmetry of a two-dimensional shape as a line across which the shape can be folded into 2 matching parts • identify a line of symmetry in two-dimensional shapes • sort two-dimensional shapes according to whether they are symmetrical or not
		2	Drawing lines of symmetry on given designs and shapes	• recognize that some designs and shapes may have more than 1 line of symmetry • identify and draw all lines of symmetry on designs and shapes • determine the total number of lines of symmetry on designs and shapes • determine whether or not a given line through designs and shapes is a line of symmetry

NWEA alignment
RIT SCORE BAND 211 - 217
Understanding Practice and Fluency (UPF)

Mathletics

Geometry
Graph points on the coordinate plane to solve real-world and mathematical problems.

Quest	Learning Journey	Steps	Content	Detail
5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).**
Introducing the coordinate plane	Introducing in the coordinate plane	1	Introducing the coordinate plane	• recognize that the coordinate plane consists of a horizontal axis (x-axis) and a vertical axis (y-axis), creating 4 quadrants • recognize that the horizontal axis and the vertical axis meet at right angles • identify the point of intersection of the 2 axes as the origin, having coordinates (0, 0)
		2	Using the coordinate plane in the first quadrant only	• recognize that the axes are labeled x and y • locate and plot points on a coordinate plane
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Graphing in the first quadrant	Graphing in the first quadrant	1	Representing and solving problems using coordinates in the first quadrant of the coordinate plane	• represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane • interpret coordinate values in the context of the situation

Classify two-dimensional figures into categories based on their properties.

Quest	Learning Journey	Steps	Content	Detail
5.G.B.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
Attributes of 2D figures	Sorting plane shapes	1	Sorting plane shapes by their spatial features	• sort a group of plane shapes by their spatial features • identify how a group of plane shapes has been sorted/classified
5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.
Classifying 2D figures, properties	Classifying 2D figures in a hierarchy	1	Classifying two-dimensional figures in a hierarchy	• classify two-dimensional figures in a hierarchy based on properties • interpret a hierarchy diagram of two-dimensional shapes and their properties
	Classifying quadrilaterals	1	Classifying quadrilaterals using a variety of strategies	• classify two-dimensional figures in a hierarchy based on properties • interpret a hierarchy diagram of two-dimensional shapes and their properties • use Venn diagrams to record classifications • interpret classifications represented using Venn diagrams

Geometry

Solve real-world and mathematical problems involving area, surface area, and volume.

Quest	Learning Journey	Steps	Content	Detail
6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.**				
Area: triangles and quadrilaterals	Finding the area of a right triangle, no formula	1	Calculating area of a right triangle without a formula (metric and customary units)	• calculate the area of right triangles using the relationship that the area is half the area of a rectangle with the same base and perpendicular height (metric and customary units) • calculate the area of right triangles where all 3 side lengths are given, using the relationship that the area is half the area of a rectangle with the same base and perpendicular height (metric and customary units)
	Finding the area of a triangle	1	Calculating area of any triangle (metric and customary units)	• calculate the area of triangles where more dimensions than are necessary are given, using the relationship that the area is half the area of a rectangle with the same base and perpendicular height (metric and customary units)
		2	Solving real-life problems involving calculating the area of triangles (metric and customary units)	• solve real-life problems involving calculating the area of triangles (metric and customary units)
	Investigating the area of special quadrilaterals	1	Investigating the area of a rhombus using rectangles (metric and customary units)	• investigate the area of a rhombus using rectangles (metric and customary units)
		2	Investigating the area of a parallelogram using rectangles (metric and customary units)	• investigate the area of a parallelogram using rectangles (metric and customary units)
		3	Investigating the area of a trapezoid using rectangles (metric and customary units)	• investigate the area of a trapezoid using rectangles (metric and customary units)
	Real-world area problems: special quadrilaterals	1	Solving real-life problems involving calculating the area of parallelograms (metric and customary units)	• solve real-life problems involving calculating the area of parallelograms (metric and customary units)
		2	Solving real-life problems involving calculating the area of kites (metric and customary units)	• solve real-life problems involving calculating the area of kites (metric and customary units)
		3	Solving real-life problems involving calculating the area of trapezoids (metric and customary units)	• solve real-life problems involving calculating the area of trapezoids (metric and customary units)
6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\,w\,h$ and $V = b\,h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.**				
Volume: rectangular prisms, formula	Volume: rectangular prisms, fraction edge lengths	1	Using the formulas $V = l \times w \times h$ and $V = b \times h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems (metric and customary units)	• use the formulas $V = l \times w \times h$ and $V = b \times h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems (metric and customary units)

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Mathletics

Geometry
Solve real-world and mathematical problems involving area, surface area, and volume.

Quest	Learning Journey	Steps	Content	Detail
6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.				
Polygons in the coordinate plane	Drawing polygons in the coordinate plane	1	Drawing polygons in the coordinate plane given coordinates for the vertices	• draw polygons in the coordinate plane given coordinates for the vertices
6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.				
Surface area	Connecting 3D objects with their nets	1	Connecting three-dimensional objects with their nets	• examine a diagram to determine whether it is or is not the net of a closed three-dimensional object • explain why a given net will not form a closed three-dimensional object • visualize and sketch nets for given three-dimensional objects • recognize whether a diagram is a net of a particular three-dimensional object • visualize and name prisms and pyramids, given diagrams of their nets • select the correct diagram of a net for a given three-dimensional object (include other regular polyhedrons)
			Investigating the nets of cubes and rectangular prisms in order to deduce formulae for calculating their surface areas	• investigate the nets of cubes and rectangular prisms in order to deduce formulae for calculating their surface areas
	Calculating the surface area of rectangular prisms	1	Developing the method of calculating surface areas of rectangular prisms (metric and customary units)	• determine, through investigation using a variety of tools, the surface area of rectangular prisms (metric and customary units)

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Geometry

Draw, construct, and describe geometrical figures and describe the relationships between them.

Quest	Learning Journey	Steps	Content	Detail
7.G.A.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
Scale drawings	Scale drawings	1	Creating scale drawings (customary and metric)	• create scale drawings from a given diagram and use to find a missing length (customary and metric) • create scale drawings from a given diagram and use to find a missing length in a diagram with cardinal compass directions (customary and metric)
		2	Solving problems using scale drawings (customary and metric)	• solve problems using scale drawings of geometric figures including actual lengths from a scale drawing (customary and metric)
7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.**
Constructing triangles	Triangle Inequality Theorem	1	Verifying the Triangle Inequality theorem using constructions and apply the theorem to solve problems	• verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems
	Constructing triangles with given conditions	1	Constructing triangles with given conditions	• construct triangles from 3 measures of angles or sides, noticing when the conditions determine a unique triangle, more than 1 triangle, or no triangle • identify, through investigation, the minimum side and angle information needed to describe a unique triangle, e.g., side-side-side, side-angle-side, angle-angle-side
7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
Cross sections of 3D figures	Describing cross sections of 3D figures	1	Describing the two-dimensional figures that result from slicing three-dimensional figures	• describe the two-dimensional figures that result from slicing three-dimensional figures, i.e., plane sections of right rectangular prisms and right rectangular pyramids

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Quest	Learning Journey	Steps	Content	Detail
7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
Circles: area and circumference	Finding the area of a circle	1	Finding the area of a circle using the formula (customary and metric)	• apply the formula to find the areas of circles given the radius (customary and metric) • apply the formula to find the areas of circles given the diameter (customary and metric)
		2	Solving real-life problems involving calculating the area of circles (customary and metric)	• solve real-life problems involving calculating the area of circles (customary and metric)
	Finding the circumference of a circle	1	Finding the circumference of a circle using a formula (customary and metric)	• find the circumference of a circle using a formula (customary and metric)

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Geometry
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Quest	Learning Journey	Steps	Content	Detail
7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.				
Using angle facts to solve problems	Supplementary angles	1	Investigating and defining supplementary angles	• investigate, with and without digital technology, adjacent angles that form a straight angle and establish that they add to 180° • define supplementary angles and identify them in diagrams
		2	Calculating consecutive interior angles	• calculate the size of an unknown angle in a diagram and explain how this is done (using consecutive interior angles)
		3	Determining the missing angle of a figure using facts about supplementary angles	• determine the missing angle of a figure such as a triangle or parallelogram using properties of supplementary angles
	Complementary angles	1	Investigating and defining complementary angles	• investigate, with and without digital technology, adjacent angles that form a right angle and establish that they add to 90° • define complementary angles and identify them in diagrams
		2	Calculating complementary angles	• calculate the size of an unknown angle in a diagram and explain how this is done (using complementary angles)
		3	Determining the missing angle of a figure using facts about complementary angles	• determine the missing angle of a figure such as a triangle or parallelogram using properties of complementary angles
	Adjacent angles	1	Applying geometric reasoning for adjacent angle relationships	• apply theorems of complementary angles, supplementary angles, vertical angles and adjacent angles, calculating unknown angles • apply theorems for adjacent angles represented by variables in multi-step problems, writing equations to solve for an unknown angle, checking the reasonableness of the answer • apply theorems of complementary angles, supplementary angles, vertical angles, and adjacent angles in multi-step problems, calculating unknown angles and stating all relationships used
		2	Determining the missing angle of a figure using facts about adjacent angles	• determine the missing angle of a figure such as a triangle or parallelogram using properties of adjacent angles
	Vertical angles	1	Exploring vertical angles	• explore the relationship between angles formed when 2 straight lines intersect and identify these as 'vertical angles' • use the equality of vertical angles to find the size of unknown angles in diagrams • use the equality of vertical angles to find the size of unknown angles represented by variables in diagrams
		2	Determining the missing angle of a figure using facts about vertical angles	• determine the missing angle of a figure such as a triangle or parallelogram using properties of vertical angles

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Geometry

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Quest	Learning Journey	Steps	Content	Detail
7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.			
Area, volume and surface area	Area: polygons	1	Applying the formula for the area of a triangle (customary and metric)	• use and apply the formula for the area of a triangle (customary and metric)
		2	Using the formula for the area of a parallelogram (customary and metric)	• apply the formula to find the area of parallelograms in different orientations (customary and metric)
		3	Using the formula for the area of a trapezoid	• apply the formula to find the area of trapezoids of different orientations and shapes (customary and metric)
		4	Finding the area of a rhombus using the formula (customary and metric)	• apply the formula to find the area of rhombuses in different orientations
			Finding the area of a kite using the formula (customary and metric)	• apply the formula to find the area of kites in different orientations
		5	Solving real-life problems involving calculating the area of polygons (customary and metric)	• solve real-life problems involving calculating the area of polygons (customary and metric)
	Volume: right prisms	1	Finding the volume of a cube using a formula (customary and metric)	• find the volume of a cube using a formula given its length, width, or height (customary and metric)
				• find the length of a cube given its volume (customary and metric)
		2	Solving a variety of practical problems involving the volume of right prisms (customary and metric)	• solve a variety of practical problems involving the volume of right prisms (customary and metric)
	Surface area: rectangular and triangular prisms	1	Finding the surface area of rectangular prisms (customary and metric)	• find the surface area of rectangular prisms given the side lengths (customary and metric) • find the surface area of rectangular prisms in real-world situations (customary and metric)
		2	Finding the surface area of triangular prisms (customary and metric)	• calculate the surface area of a triangular prism given the area of the triangular cross section, the side lengths of the triangle and the height of the prism (customary and metric) • calculate the surface area of a triangular prism given the height and base length of the triangle cross section and the height of the prism (customary and metric) • solve real-life problems involving the surface area calculation of triangular prisms (customary and metric)

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Mathletics

Geometry
Understand congruence and similarity using physical models, transparencies, or geometry software.

Quest	Learning Journey	Steps	Content	Detail
8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations.				
Introducing rigid transformations	Translating points on the coordinate plane	1	Plotting transformations of points on the coordinate plane	• plot and state the coordinates of the image of a point on the coordinate plane resulting from 1 or more translations
	Reflecting points across the x- or y-axis	1	Plotting and stating the coordinates of the image of a given point on a coordinate plane resulting from reflection in either the x-axis or y-axis	• plot and state the coordinates of the image of a given point on the coordinate plane resulting from reflection in either the x-axis or y-axis • investigate and describe the relationship between the coordinates of P and P' following a reflection in the x- or y-axis
	Rotating points about the origin	1	Plotting and stating the coordinates of the image of a given point on a coordinate plane resulting from rotation of multiples of 90° about the origin	• plot and state the coordinates of the image of a given point on a coordinate plane resulting from a rotation of 90° about the origin • plot and state the coordinates of the image of a given point on the coordinate plane resulting from a rotation of 180° about the origin • investigate and describe the relationship between the coordinates of P and P' following a rotation of 180° about the origin • plot and state the coordinates of the image of a given point on the coordinate plane resulting from a rotation of 270° about the origin
		2	Plotting points rotated about the origin	• plot and state the coordinates of the image of a given point on the coordinate plane resulting from a rotation about the origin using multiples of 90° in either direction (clockwise or counterclockwise)
			Understanding transformation terminology	• understand and identify that the original shape and position is referred to as the 'object' or 'preimage' and the shapes and position of the translated object is referred to as the 'image'
8.G.A.1.A Lines are taken to lines, and line segments to line segments of the same length.				
Preserved properties: length	Preserved properties: length	1	Identifying the length of a line or line segment after a translation, reflection, or rotation	• identify the length of a line or line segment after a translation, reflection, or rotation
8.G.A.1.B Angles are taken to angles of the same measure.				
Preserved properties: angles	Preserved properties: angles	1	Identifying the measure of an angle after a translation, reflection, or rotation	• identify the measure of an angle after a translation, reflection, or rotation
8.G.A.1.C Parallel lines are taken to parallel lines.				
Preserved properties: parallel lines	Preserved properties: parallel lines	1	Identifying parallel lines after a translation, reflection, or rotation	• identify parallel lines after a translation, reflection, or rotation

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Geometry

Understand congruence and similarity using physical models, transparencies, or geometry software.

Quest	Learning Journey	Steps	Content	Detail
8.G.A.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.				
Congruency: rigid transformations	Congruency: rigid transformations	1	Exploring combinations of transformations on a given figure (including reflection in the line y = x)	• explore and describe different combinations of transformations that produce the same image of a given figure (including reflection in the line y = x)
8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.				
Transformations, coordinates	Dilations, coordinates	1	Exploring the effects of dilation on two-dimensional figures using coordinates	• describe the effects of dilation on two-dimensional figures using coordinates • determine the figure's new position on the coordinate plane given a particular dilation
	Translations, coordinates	1	Exploring the effects of translations on two-dimensional figures using coordinates	• describe the effects of translations on two-dimensional figures using coordinates • determine the figure's new position on the coordinate plane given a particular translation
	Rotations, coordinates	1	Exploring the effects of rotations on two-dimensional figures using coordinates	• describe the effects of rotations on two-dimensional figures using coordinates • determine the figure's new position on the coordinate plane given a particular rotation
	Reflections, coordinates	1	Describing the effects of reflection on two-dimensional figures using coordinates	• describe the effects of reflection on two-dimensional figures using coordinates • determine the figure's new position on the coordinate plane given a particular reflection
	Sequences of transformations	1	Exploring the effects following a combination of dilation, translation, rotation or reflection on two-dimensional figures using coordinates	• describe the effects following a combination of dilation, translation, rotation or reflection on two-dimensional figures using coordinates • determine the figure's new position on the coordinate plane given a particular combination of dilation, translation, rotation, or reflection
			Introducing similarity	• introduce the definition of similarity • introduce the symbol for similarity
8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.				
Similarity: transformations	Similarity: transformations	1	Describing a sequence that exhibits the similarity between them, given two similar two-dimensional figures	• describe a sequence that exhibits the similarity between them, given two similar two-dimensional figures
			Calculating interior angle sum of a triangle	• explore through measurement the sum of interior angles of a triangle

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Geometry

Understand congruence and similarity using physical models, transparencies, or geometry software.

Quest	Learning Journey	Steps	Content	Detail
8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.				
Triangles and angle relationships	Angle sum theorem	1	Calculating interior angle sum of a triangle	• calculate an unknown angle represented by a variable within a triangle, given the other 2 angles
			Defining that the exterior angle of a triangle is formed by extending 1 side of the triangle beyond the vertex	• define that the exterior angle of a triangle is formed by extending 1 side of the triangle beyond the vertex
	Exterior angle theorem		Calculating the exterior angle of a triangle	• explore, through measurement, the relationship between the exterior angle of a triangle and the sum of the opposite 2 interior angles • calculate an unknown angle represented by a variable using the relationship between the exterior angle of a triangle and the sum of the opposite interior angles
	Angle relationships: parallel lines, transversal	1	Exploring special pairs of angles on parallel lines	• define, identify and draw transversals on sets of 2 or more parallel lines • explore, through measurement, the relationships between pairs of angles formed when a transversal is drawn on a pair of parallel lines • define and identify pairs of equal corresponding angles when 2 or more parallel lines are cut by a transversal • define and identify pairs of equal alternate angles when 2 or more parallel lines are cut by a transversal • define and identify pairs of supplementary cointerior angles when 2 or more parallel lines are cut by a transversal
	Using scale to analyze similar triangles	1	Using scale to analyze similar triangles	• find the missing side on triangle given its similar figure and scale factor • find the missing angle on triangle given its similar figure and scale factor • prove 2 triangles are similar and then find the scale factor
	Identifying similar triangles	1	Identifying similar triangles without coordinate grids	• identify which of a set of given triangles are similar without coordinate grids

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Mathletics

Geometry
Understand and apply the Pythagorean Theorem.

Quest	Learning Journey	Steps	Content	Detail
8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse.				
The Pythagorean Theorem and its converse	Identifying the hypotenuse, right triangles	1	Identifying the hypotenuse as the longest side in any right triangle and also as the side opposite the right angle	• identify the hypotenuse as the longest side in any right triangle and also as the side opposite the right angle • describe how to identify the hypotenuse in a right triangle using either the fact that it is the longest side or the side opposite the right angle
	Identifying right triangles, Pythagorean Theorem	1	Explaining a proof of the Pythagorean Theorem and its converse	• explain a proof of the Pythagorean Theorem and its converse
		1	Identifying a Pythagorean triple as a set of 3 numbers that satisfy the Pythagorean Theorem	• identify a Pythagorean triple as a set of 3 numbers that satisfy the Pythagorean Theorem • establish new Pythagorean triples by starting with another • identify that when each term of a Pythagorean triple is multiplied/divided by a constant, the resulted 3 figures also form a Pythagorean triple
8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.				
Applying the Pythagorean Theorem	Pythagorean Theorem: missing short side	1	Finding the length of an unknown side (shorter sides only) using the Pythagorean Theorem	• find the length of an unknown side (shorter sides only) using the Pythagorean Theorem
		2	Finding the length of an unknown side (shorter sides only) using the Pythagorean Theorem, rounding answers	• find the length of an unknown side (shorter sides only) using the Pythagorean Theorem, rounding answers
	Pythagorean Theorem: missing hypotenuse	1	Finding the length of an unknown side (hypotenuse only) using the Pythagorean Theorem	• find the length of an unknown side (hypotenuse only) using the Pythagorean Theorem
		2	Finding the length of an unknown side (hypotenuse only) using the Pythagorean Theorem, rounding answers	• find the length of an unknown side (hypotenuse only) using the Pythagorean Theorem, rounding answers
	Pythagorean Theorem: missing side	1	Finding the length of an unknown side (shorter side and hypotenuse) using the Pythagorean Theorem	• find the length of an unknown side (shorter side and hypotenuse) using the Pythagorean Theorem
		2	Finding the length of an unknown side (shorter side and hypotenuse) using the Pythagorean Theorem, rounding answers	• find the length of an unknown side (shorter side and hypotenuse) using the Pythagorean Theorem, rounding answers

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Geometry
Understand and apply the Pythagorean Theorem.

Quest	Learning Journey	Steps	Content	Detail
8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.				
Applying the Pythagorean Theorem	Pythagorean Theorem in 2D and 3D	1	Solving a variety of problems involving unknown lengths in two-dimensional figures that contain right triangles within them	• solve a variety of problems involving unknown lengths in two-dimensional figures that contain right triangles within them
		2	Solving a variety of problems involving unknown lengths in three-dimensional figures that contain right triangles within them	• solve a variety of problems involving unknown lengths in three-dimensional figures that contain right triangles within them
8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.				
Distance between two points	Finding the distance between two points	1	Using the Pythagorean Theorem to find the distance between two coordinates on a coordinate plane	• use the Pythagorean Theorem to find the distance between two coordinates on a coordinate plane
		2	Using the distance formula to find the distance between two coordinates on a coordinate plane	• use the distance formula to find the distance between two coordinates on a coordinate plane

Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

Quest	Learning Journey	Steps	Content	Detail
8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.				
Volume: cones, cylinders and spheres	Volume: cones	1	Using the formula to find the volume of a cone	• find the volume of a cone given the area of the circle cross-section and perpendicular height in the same units • find the volume of a cone given the area of the circle cross-section and perpendicular height in different units • find the height or area of the circle cross section for a cone given the volume in the same units • find the height or area of the circle cross section for a cone given the volume in different units • find the volume of cones, given their perpendicular heights and radius/diameter of their circular cross sections all in the same units. • find the volume of cones, given their perpendicular heights and radius/diameter of their circular cross sections all in different units • find the radius, diameter or height of cones, given their volume all in the same units • find the radius, diameter or height of cones, given their volume all in different units • use the formula for the volume of a cone given the cone's dimensions with the answer given in exact form or to a given number of decimal places

Geometry
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

Quest	Learning Journey	Steps	Content	Detail
8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Volume: cones, cylinders and sphere	Volume: cones	2	Solving a variety of practical problems involving the volume of cones	• solve a variety of practical problems involving the volume of cones
			Modeling the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connecting that relationship to the formulae	• model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulae
	Volume: cylinders	1	Using the formula to find the volumes of cylinders	• find the volume of a right cylinder given the area of the circle cross section and perpendicular height in the same units • find the volume of a right cylinder given the area of the circle cross section and perpendicular height in different units
		2	Finding the volume of right cylinders, given their perpendicular heights and radius/diameter of their circular cross sections all in the same units	• find the volume of right cylinders, given their perpendicular heights and radius/diameter of their circular cross sections all in the same units • find the volume of right cylinders, given their perpendicular heights and radius/diameter of their circular cross-sections all in different units
		3	Finding the height or area of the circle cross section for a right cylinder given the volume in the same units	• find the height or area of the circle cross section for a right cylinder given the volume in the same units • find the height or area of the circle cross section for a right cylinder given the volume in different units
		4	Finding the radius, diameter or height of right cylinders, given their volume all in the same units	• find the radius, diameter or height of right cylinders, given their volume all in the same units • find the radius, diameter or height of right cylinders, given their volume all in different units
		5	Solving a variety of practical problems involving the volume of cylinders	• solve a variety of practical problems involving the volume of cylinders
	Volume: spheres	1	Using the formula to find the volume of spheres	• use the formula for the volume of a sphere given the spheres radius • find the radius of a sphere given its volume • use the formula for the volume of a sphere given the spheres dimensions with answer given in exact form or to a given number of decimal places
		2	Solving a variety of practical problems involving the volume of spheres	• solve a variety of practical problems involving the volume of spheres including related problems such as half of spheres

Understanding Practice and Fluency (UPF)

Ratios & Proportional Relationships
Understand ratio concepts and use ratio reasoning to solve problems.

Quest	Learning Journey	Steps	Content	Detail
6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.				
Introduction to ratios	Defining, understanding and writing ratios	1	Defining ratios	• define ratios • understand the symbol
		2	Identifying why the ratio a:b is different to the ratio b:a	• identify why the ratio a:b is different to the ratio b:a
		3	Representing ratios between quantities found in real-life contexts, using concrete materials	• finding missing values in tables • represent ratios found in real-life contexts, using concrete materials • write ratios using the : symbol
6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.				
Introduction to unit rate	Understanding unit rates and making comparisons	1	Understanding that a rate, in simplest form, is the comparison of an amount per unit value of another	• understand that a rate, in simplest form, is the comparison of an amount per unit value of another
		2	Introducing rates (customary units)	• understand that a rate, in simplest form, is the comparison of an amount per unit value of another • understand and describe rates as 1 value in units per another value in different units, e.g., 25 mi. every hour is described as 25 miles per hour
6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.				
Solving ratio and rate problems				
6.RP.A.3.A Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.				
Ratio tables	Creating tables of equivalent ratios	1	Creating tables of equivalent ratios	• make tables of equivalent ratios relating quantities
		2	Finding missing values in a table of values	• find missing values in tables
		3	Comparing ratios using a table of values	• compare ratios using a table of values
	Plotting coordinates from ratio tables	1	Plotting pairs of values from ratio tables on the coordinate plane	• plot pairs of values from ratio tables on the coordinate plane

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Ratios & Proportional Relationships
Understand ratio concepts and use ratio reasoning to solve problems.

Quest	Learning Journey	Steps	Content	Detail
6.RP.A.3.B Solve unit rate problems including those involving unit pricing and constant speed.				
Solving unit rate problems	Solving unit rate problems for given time periods	1	Determining an amount for a given time period given a rate	• determine an amount for a given time period given a unit rate • determine an amount for a given time period given a rate
	Solving unit rate problems involving unit pricing	1	Solving unit rate problems involving unit pricing (U.S. currency)	• solve unit rate problems involving unit pricing (U.S. currency)
6.RP.A.3.C Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given a part and the percent.				
Percent of a quantity	Expressing rates as a percent	1	Expressing simple ratios as a percentage	• find a percent of a quantity as a rate per 100, e.g., 30% of a quantity means 30/100 times the quantity
	Solving percent problems: finding the whole	1	Solving problems involving finding the whole, given a part and the percent	• solve problems involving finding the whole, given a part and the percent
6.RP.A.3.D	**Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.**			
Converting measurements using ratios	Converting measurement units using ratios	1	Converting between customary units of measurement using ratios	• convert between customary units of measurement using ratios

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Mathletics

The Number System
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

Quest	Learning Journey	Steps	Content	Detail
6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.
Dividing fractions	Dividing a fraction by a positive integer	1	Dividing a unit fraction by a positive integer	• divide unit fractions by whole numbers, e.g., 1/3 ÷ 2 = 1/6
		2	Dividing a proper fraction by a positive integer	• divide a non-unit proper fraction by a whole number (where the divisor is a factor of the numerator). Use diagrams for support • divide a non-unit proper fraction by any whole number
		3	Dividing an improper fraction by a positive integer	• divide an improper fraction by a positive integer
		4	Dividing a mixed number by a positive integer	• divide a mixed number by a positive integer
	Dividing a positive integer by a fraction	1	Dividing a positive integer by a proper fraction	• divide a positive integer by a proper fraction
		2	Dividing a positive integer by an improper fraction	• divide a positive integer by an improper fraction and mixed number
		3	Dividing a positive integer by a mixed number	• divide a positive integer by a mixed number
	Dividing a fraction by a fraction	1	Dividing a proper fraction by a proper fraction	• divide a proper fraction by a proper fraction
		2	Dividing improper fractions by proper fractions and vice versa	• divide improper fractions by proper fractions and vice versa
		3	Dividing an improper fraction by an improper fraction	• divide an improper fraction by an improper fraction
	Dividing fractions and mixed numbers	1	Dividing mixed numbers by proper fractions and vice versa	• divide mixed numbers by proper fractions and vice versa
		2	Dividing an improper fraction by a mixed number and vice versa	• divide an improper fraction by a mixed number and vice versa
			Understanding and demonstrating that dividing a number by a fraction is the same as multiplying by its reciprocal	• understand that dividing by a fraction is equal to multiplying by its reciprocal
		3	Dividing a mixed number by a mixed number	• divide a mixed number by a mixed number

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

The Number System

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

Quest	Learning Journey	Steps	Content	Detail
6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.				
Dividing fractions	Multiplying by the reciprocal	1	Understanding and demonstrating that dividing a number by a fraction is the same as multiplying by its reciprocal	• demonstrate that dividing by a fraction is equal to multiplying by its reciprocal
	Solving word problems: division of fractions	1	Solving word problems involving division of fractions by fractions	• solve word problems involving division of fractions by fractions

Compute fluently with multi-digit numbers and find common factors and multiples.

Quest	Learning Journey	Steps	Content	Detail
6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.				
Dividing multi-digit numbers, algorithm	Divide 4-digit by 2-digit numbers, no remainder	1	Dividing up to a 4-digit number by a 2-digit divisor using the standard algorithm, no remainders or zeros in the answer	• apply the standard algorithm to divide up to a 4-digit number by a 2-digit number
	Divide 4-digit by 2-digit numbers, with remainders	1	Dividing up to a 4-digit number by a 2-digit divisor using the standard algorithm, with remainders but without zeros in answers	• apply the standard algorithm to divide up to a 4-digit number by a 2-digit number, with remainders and without zeros in the answer
	Divide 4-digit by 2-digit numbers	1	Dividing up to a 4-digit number by a 2-digit divisor using the standard algorithm, with and without remainders and zeros in answers	• apply the standard algorithm to divide up to a 4-digit number by a 2-digit number, with and without remainders and zeros in the answer

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Mathletics

The Number System
Compute fluently with multi-digit numbers and find common factors and multiples.

Quest	Learning Journey	Steps	Content	Detail
6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.				
Operations with multi-digit decimals	Adding decimals using the standard algorithm	1	Adding decimals using standard algorithm	• use a standard algorithm to add decimals with the same number of decimal places • use a standard algorithm to add decimals with a different number of decimal places • use estimation and rounding to check the reasonableness of answers when adding decimals
	Subtracting decimals using the standard algorithm	1	Subtracting decimals using standard algorithm	• use a standard algorithm to subtract decimals with the same number of decimal places • use a standard algorithm to subtract decimals with a different number of decimal places • use estimation and rounding to check the reasonableness of answers when subtracting decimals
	Multiplying decimals using the standard algorithm	1	Multiplying decimals using written method	• multiply decimals up to thousandths using a standard algorithm
	Dividing decimals using the standard algorithm	1	Dividing decimals using standard algorithm	• divide decimals up to thousandths using a standard algorithm
	Word problems: adding and subtracting decimals	1	Adding and subtracting decimal word problems involving comparison	• add decimal word problems involving comparison • subtract decimal word problems involving comparison
	Word problems: multiplying and dividing decimals	1	Solving decimal word problems involving multiplying and dividing	• solve decimal word problems involving multiplying • solve decimal word problems involving dividing
6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.				
GCF and LCM	Greatest common factor	1	Finding the greatest common factor using a list	• find the greatest common factor using a list
		2	Finding greatest common factor from prime factors (no exponents)	• determine the greatest common factor of 2 whole numbers using their prime factorizations (no exponents)
	Least common multiple	1	Finding the least common multiple of 2 whole numbers less than or equal to 12	• find the least common multiple of 2 whole numbers less than or equal to 12

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

The Number System
Compute fluently with multi-digit numbers and find common factors and multiples.

Quest	Learning Journey	Steps	Content	Detail
6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.				
GCF and LCM	Solving word problems: factors and multiples	1	Solving problems using factors and multiples	• solve problems using knowledge of factors and multiples, e.g., 'There are 48 people at a party. In how many ways can you set up the tables and chairs, so that each table seats the same number of people and there are no empty chairs?'
	Factoring using the distributive property	1	Using the distributive property to express a sum of 2 whole numbers 1–100 with a common factor	• use the distributive property to express a sum of 2 whole numbers 1–100 with a common factor

Apply and extend previous understandings of numbers to the system of rational numbers.

Quest	Learning Journey	Steps	Content	Detail
6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.				
Positive and negative numbers	Investigating and interpreting integers	1	Investigating integers	• recognize the location of negative whole numbers in relation to zero and place them on a number line • use the term 'integers' to describe positive and negative whole numbers and zero • investigate negative whole numbers and the number patterns created when counting backwards on a calculator • recognize that negative whole numbers can result from subtraction
		2	Interpreting integers in context	• use a model to interpret intervals across zero (in context)

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

The Number System
Apply and extend previous understandings of numbers to the system of rational numbers.

Quest	Learning Journey	Steps	Content	Detail
6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.				
Introducing rational numbers				
6.NS.C.6.A Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite.				
Opposites on the number line	Opposites on the number line	1	Recognizing the +3 and -3 are 'opposites' located the same distance away from 0 on the number line	• recognize the +3 and -3 are 'opposites' located the same distance away from 0 on the number line
6.NS.C.6.B Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.**				
Graphing in the 4 quadrants	Graphing coordinates in the 4 quadrants	1	Locating points on the coordinate plane	• plot and label points, given coordinates, in all 4 quadrants of the coordinate plane • identify and label each quadrant on a coordinate plane • plot a sequence of coordinates to create a picture • identify and record the coordinates of given points in all 4 quadrants of the coordinate plane • recognize that the order of coordinates is important when locating points on the coordinate plane, e.g., (2, 3) is a location different from (3, 2)
	Graphing coordinates across the x- and y-axis	1	Recognizing that when 2 ordered pairs differ only by signs, the locations of the points are reflections across 1 or both axes	• recognize that when 2 ordered pairs differ only by signs, the locations of the points are reflections across 1 or both axes
6.NS.C.6.C Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.				
Graphing rational numbers	Placing rational numbers on the number line	1	Placing integers on a number line	• place integers on a number line
		2	Finding and placing rational numbers on a horizontal or vertical number line diagram	• find and place rational numbers on a horizontal or vertical number line diagram
	Graphing rational numbers on the coordinate plane	1	Plotting coordinates on the coordinate plane (not whole numbers)	• plot and label points on the coordinate plane, given coordinates, including those with coordinates that are not whole numbers • identify and record the coordinates of given points on the coordinate plane, including those with coordinates that are not whole numbers

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

The Number System
Apply and extend previous understandings of numbers to the system of rational numbers.

Quest	Learning Journey	Steps	Content	Detail
**6.NS.C.7 Understand ordering and absolute value of rational numbers.**				
Order & absolute value: rational numbers				
**6.NS.C.7.A Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.**				
Comparing rational numbers	Comparing integers	1	Comparing the relative value of integers, including recording the comparison by using the symbols < and >	• compare the relative value of integers, including recording the comparison by using the symbols < and > including negative integers
	Comparing rational numbers	1	Comparing the relative value of rational numbers, including recording the comparison by using the symbols < and >	• compare the relative value of rational numbers, including recording the comparison by using the symbols < and >
**6.NS.C.7.B Write, interpret, and explain statements of order for rational numbers in real-world contexts.**				
Ordering rational numbers	Exploring the everyday language of integers	1	Exploring everyday language around integers (positive and negative numbers)	• explore and relate the everyday language of a variety of real-world situations to the use of negative and positive numbers and explain the meaning of 0 in each situation • represent statements about real-world contexts using integers
	Statements of order: rational numbers	1	Writing, interpreting, and explaining statements of order for rational numbers in real-world contexts using < and >	• write statements of order for rational numbers in real-world contexts using < and > • interpret statements of order for rational numbers in real-world contexts using < and > • explain statements of order for rational numbers in real-world contexts using < and >
**6.NS.C.7.C Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.**				
Introducing absolute value	Introducing absolute value	1	Introducing absolute value	• understand the absolute value of a rational number as its distance from 0 on the number line • interpret absolute value as magnitude for a positive or negative quantity in a real-world situation, e.g., for an account balance of -3 dollars, write $|-3| = 3$ to describe the size of the debt in dollars • distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars
**6.NS.C.7.D Distinguish comparisons of absolute value from statements about order.**				
Absolute value vs order	Interpreting meanings of integers in context	1	Interpreting different meanings for the + and – according to the context within which it is being used	• interpret different meanings for the + and – according to the context within which it is being used (eg direction or as an operation). For example, the location of an object given as – 10 m is 10 m below ground, or a golfer with a score of -2 is doing better than a golfer with a score of 2 as they are under par

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Mathletics

The Number System
Apply and extend previous understandings of numbers to the system of rational numbers.

Quest	Learning Journey	Steps	Content	Detail
6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.				
Solve problems by graphing: 4 quadrants	Solving problems by graphing in the 4 quadrants	1	Solving real-world and mathematical problems by graphing points in all 4 quadrants of the coordinate plane	• solve real-world and mathematical problems by graphing points in all 4 quadrants of the coordinate plane
	Find the distance between 2 points, absolute value	1	Using coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate	• use coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Ratios & Proportional Relationships

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Quest	Learning Journey	Steps	Content	Detail
7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.				
Unit rates with fractions	Solving unit rate problems involving fractions	1	Applying the unitary method to ratio problems involving fractions (customary and metric units)	• apply the unitary method to ratio problems involving fractions (customary and metric units) • solve a variety of real-life problems involving ratios of fractions (customary and metric units)
7.RP.A.2 Recognize and represent proportional relationships between quantities.				
Understanding proportional relationships				
7.RP.A.2.A Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.				
Identifying proportional relationships	Identifying proportional relationships	1	Determining whether 2 quantities are in a proportional relationship	• determine whether 2 quantities are in a proportional relationship
7.RP.A.2.B Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.				
Constant of proportionality	Identifying the constant of proportionality	1	Identifying the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships	• identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships
7.RP.A.2.C Represent proportional relationships by equations.				
Representing proportional relationships	Representing proportional relationships: equations	1	Representing proportional relationships by equations	• represent proportional relationships by equations
7.RP.A.2.D Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.				
Graphs of proportional relationships	Interpreting graphs of proportional relationships	1	Understanding what a point (x, y) on the graph of a proportional relationship means in terms of the situation	• understand what a point (x, y) on the graph of a proportional relationship means in terms of the situation
7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.				
Ratio and percent problems	Solving multi-step ratio and percent problems	1	Solving multi-step ratio and percent problems using proportional relationships	• solve multi-step ratio and percent problems using proportional relationships

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

The Number System
Apply and extend previous understandings of operations with fractions.

Quest	Learning Journey	Steps	Content	Detail
7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.				
7.NS.A.1.A Describe situations in which opposite quantities combine to make 0.				
Understanding opposites	Describing situations involving opposites	1	Describing situations in which opposite quantities combine to make 0	• describe situations in which opposite quantities combine to make 0, eg a hydrogen atom has 0 charge because its 2 constituents are oppositely charged
7.NS.A.1.B Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.				
Adding rational numbers	Opposites and absolute value	1	Identifying a number, its opposite, and its absolute value	• identify a number, its opposite, and its absolute value
	Adding rational numbers	1	Adding rational numbers	• add rational numbers
		2	Interpreting sums of rational numbers by describing real-world contexts	• interpret sums of rational numbers by describing real-world contexts
	Adding positive and negative fractions	1	Adding positive and negative fractions	• add positive and negative fractions
	Adding positive and negative decimals	1	Adding positive and negative decimals	• add positive and negative decimals
	Adding integers	1	Adding integers	• add integers
7.NS.A.1.C Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.				
Subtracting rational numbers	Subtracting rational numbers: adding the inverse	1	Understanding subtraction of rational numbers as adding the additive inverse	• understand subtraction of rational numbers as adding the additive inverse
	Subtracting positive and negative fractions	1	Subtracting positive and negative fractions	• subtract positive and negative fractions
	Subtracting positive and negative decimals	1	Subtracting positive and negative decimals	• subtract positive and negative decimals
	Subtracting integers	1	Subtracting integers	• subtract integers
	Subtracting rational numbers: absolute value	1	Understanding that the distance between 2 rational numbers on the number line is the absolute value of their difference	• understand that the distance between 2 rational numbers on the number line is the absolute value of their difference • apply the principle of distance between rational numbers in real-world contexts
7.NS.A.1.D Apply properties of operations as strategies to add and subtract rational numbers.				
Rational numbers: addition properties	Add/subtract rational numbers: properties	1	Applying properties of operations as strategies to add and subtract rational numbers	• apply properties of operations as strategies to add and subtract rational numbers, ie fractions, decimals and integers

The Number System
Apply and extend previous understandings of operations with fractions.

Quest	Learning Journey	Steps	Content	Detail
7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.				
Multiply and divide rational numbers				
7.NS.A.2.A Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.				
Multiplying rational numbers	Multiplying rational numbers	1	Understanding that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations	• understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations
	Multiplying positive and negative fractions	1	Applying the unitary method to ratio problems involving fractions (customary and metric units)	• apply the unitary method to ratio problems involving fractions (customary and metric units)
	Multiplying positive and negative decimals	1	Multiplying positive and negative decimals	• multiply positive and negative decimals
	Multiplying integers	1	Multiplying integers	• multiply integers
	Products of rational numbers: real-world contexts	1	Interpreting products of rational numbers by describing real-world contexts	• interpret products of rational numbers by describing real-world contexts
7.NS.A.2.B Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then -(p/q) = (-p)/q = p/(-q). Interpret quotients of rational numbers by describing real-world contexts.				
Dividing integers	Dividing integers	1	Understanding that integers can be divided, provided that the divisor is not 0	• understand that integers can be divided, provided that the divisor is not 0
	Quotients of rational numbers: real-world contexts	1	Interpreting quotients of rational numbers by describing real-world contexts	• interpret quotients of rational numbers by describing real-world contexts
7.NS.A.2.C Apply properties of operations as strategies to multiply and divide rational numbers.				
Rational numbers: multiplying properties	Multiply/divide rational numbers: properties	1	Applying properties of operations as strategies to multiply and divide rational numbers	• apply properties of operations as strategies to multiply and divide rational numbers, i.e., fractions, decimals, and integers
7.NS.A.2.D Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.				
Converting rational numbers to decimals	Use long division to convert rationals to decimals	1	Converting a rational number to a decimal using long division	• convert a rational number to a decimal using long division
7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.				
Rational numbers problems: 4 operations	Rational numbers problems: 4 operations	1	Solving real-world and mathematical problems involving the 4 operations with rational numbers	• solve real-world and mathematical problems involving the 4 operations with rational numbers

Mathletics

The Number System

Know that there are numbers that are not rational, and approximate them by rational numbers.

Quest	Learning Journey	Steps	Content	Detail
8.NS.A.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.				
Rational and irrational numbers	Describing properties of irrational numbers	1	Describing informally the properties of irrational numbers	• describe informally the properties of irrational numbers
			Understanding the infinite nature of the sets of integers, real and rational numbers	• appreciate the infinite nature of the sets of integers, real and rational numbers
	Classifying real numbers	1	Describing the real number system by recognizing, defining, and distinguishing properties of natural numbers, whole numbers, integers, rational numbers, and irrational numbers	• describe the real number system by recognizing, defining, and distinguishing properties of natural numbers, whole numbers, integers, rational numbers, and irrational numbers
			Understanding informally that every number has a decimal expansion	• understand informally that every number has a decimal expansion
	Converting repeating decimals to rational numbers	1	Converting a decimal expansion that repeats into a rational number	• convert a decimal expansion that repeats into a rational number
	Repeating and terminating decimals as fractions	1	Demonstrating that the decimal expansion of a rational number either repeats or terminates	• demonstrate that the decimal expansion of a rational number either repeats or terminates
8.NS.A.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).				
Approximating irrational numbers	Comparing irrational numbers	1	Using rational approximations of irrational numbers to compare the size of irrational numbers	• use rational approximations of irrational numbers to compare the size of irrational numbers
	Locating irrational numbers on a number line	1	Approximating the location of irrational numbers on a number line	• approximate the location of irrational numbers on a number line
	Approximating the value of an irrational number	1	Approximating the value of an irrational number, including π and square roots of numbers less than 225	• approximate the value of an irrational number, including π and square roots of numbers less than 225
		2	Estimating the value of expressions involving irrational numbers	• estimate the value of expressions involving irrational numbers
	Finding square roots of non-perfect squares	1	Finding square roots of non-perfect squares	• use a calculator to calculate approximations of square roots of positive integers and positive non-integers • mentally determine between which 2 whole numbers lies the square root of a non-perfect square number up to 100 • estimate the square root of a non-perfect square number up to 100

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Statistics & Probability
Develop understanding of statistical variability.

Quest	Learning Journey	Steps	Content	Detail
6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.				
Statistical questions	Evaluating statistical questions	1	Evaluating statistical questions	• recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers
6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.				
Shape of data distribution	Introducing the shape of data distribution	1	Introducing the shape of data distribution	• describe the center, spread, and overall shape of a data distribution
6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.				
Measures of center and variation	Introducing the upper and lower quartiles	1	Introducing the upper and lower quartiles	• identify the range and median in a set of data • use the range and median to identify the upper and lower quartiles;- understand that the 25% of values sit beneath the lower quartile and 25% of values sit above the upper quartile • compare upper and lower quartiles in sets of data;- relate data distribution shapes to the upper and lower quartiles
	Introducing interquartile range	1	Introducing interquartile range	• identify the range, median, and upper and lower quartiles in a set of data • identify the interquartile range in a set of data;- understand that 50% of the data values sit within the interquartile range • compare the interquartile range in sets of data;- relate data distribution shapes to the interquartile range
	Understanding the median	1	Understanding the median	• explore a set of values in data displays and in lists with the aim of summarizing all of the values with a single number • organize values in order and find the middle number (median) • decide if the median is the best representative number for the center of data set;- justify and discuss
	Understanding the mean	1	Understanding the mean	• explore a set of values in data displays and in lists with the aim of summarising all of the values with a single number • calculate the mean for a small set of data that would produce a whole number • use the mean to describe the shape of the data set across its range of values, using charts, tables, and graphs (eg, 'The data values fall mainly into two groups on both sides of the mean.';- 'The set of data is not spread out evenly around the mean.') • decide if the mean is the best representative number for the center of the data set;- justify and discuss

Statistics & Probability
Summarize and describe distributions.

Quest	Learning Journey	Steps	Content	Detail
6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.				
Data displays	Constructing data displays	1	Constructing data displays for numerical data using dot plots, histograms, and stacked box plots	• display numerical data in plots on a number line, including dot plots, histograms, and stacked box plots
	Reading and interpreting data in a dot plot	1	Reading and interpreting data in a dot plot	• describe and interpret data in a dot plot;- ask and answer questions related to the data in the display;- draw conclusions, e.g., 'The graph shows that the heights of all children in the class are between 125 cm and 154 cm' • determine the total number of data values represented in dot plots • identify and describe relationships that can be observed in data displays, e.g., 'There are four times as many children in Year 5 whose favorite food is noodles compared to children whose favorite food is chicken' • compare dot plots to other types of displays
	Reading and interpreting data in a histogram	1	Reading and interpreting data in a histogram	• read and interpret data in a histogram
	Reading and interpreting box-and-whisker plots	1	Introducing and interpreting box-and-whisker plots	• become familiar with the structure of a box-and-whisker plot including minimum and maximum values, range, median, interquartile range, upper and lower quartiles • identify measures of center, spread, and variation in a box-and-whisker plot
6.SP.B.5 Summarize numerical data sets in relation to their context.				
Summarizing numerical data	Summarizing numerical data	1	Summarizing a set of data	• report the number of observations • describe the nature of the attribute being measured, how it was measured and the unit of measurement • give measure of center and spread;- describe overall pattern;- describe major deviations from the pattern with reference to the context in which the data was gathered • relate the choice of measure of center and variability to the shape of the data distribution and the context in which the data was gathered
6.SP.B.5.A Reporting the number of observations.				
Reporting observations	Reporting observations in a data display	1	Reporting the number of observations in a data display	• report the number of observations in a dot plot • report the number of observations in a histogram • report the number of observations in a box plot
6.SP.B.5.B Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.				
Attributes of data	Describing attributes of data in data displays	1	Describing attributes of data, including how they were measured, in different data displays	• describe attributes of data, including how they were measured, in different data displays

NWEA alignment
RIT SCORE BAND 218 - 221
Understanding Practice and Fluency (UPF)

Statistics & Probability
Summarize and describe distributions.

Quest	Learning Journey	Steps	Content	Detail
**6.SP.B.5.C Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.**					
Calculate measures of center & variation	Calculating the mean absolute deviation	1	Finding the mean absolute variation	• identify the absolute value of each piece of data in comparison to the mean and enter the absolute value into a table • find the mean absolute deviation by totaling all the absolute values and dividing by the number of values
	Calculating the median	1	Calculating the median	• organize values in order and find the middle number (median)
	Calculating the mean	1	Calculating the mean	• calculate the mean for a small set of data
	Identifying clusters, gaps and outliers	1	[check: only difference is punctuation] Identifying any clusters, gaps, and outliers in sets of data	• Identify any clusters, gaps, and outliers in sets of data • identify any clusters, gaps, and outliers in sets of data when represented in different displays
	Identifying skewed and symmetrical sets of data	1	Identifying skewed and symmetrical sets of data	• identify skewed and symmetrical sets of data
**6.SP.B.5.D Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.**					
Relating measures of center & variation	Choosing appropriate measures of center & variation	1	Recognizing which statistical measures are appropriate for the data type, e.g., the mean, median, and range are meaningless for categorical data	• recognize which statistical measures are appropriate for the data type • explain why one measure is the most appropriate • describe real-life situations where either mean, median, or range would be the most appropriate statistical measure
	Comparing measures of center and variation	1	Comparing measures of central tendency and spread across data sets and data displays	• compare similarities and differences between two related sets of data, using a variety of strategies (e.g., by representing the data using tally charts, stem-and-leaf plots, double bar graphs, or broken-line graphs;- by determining measures of central tendency [i.e., mean, median, and mode];- by describing the shape of a data set across its range of values).

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Statistics & Probability
Use random sampling to draw inferences about a population.

Quest	Learning Journey	Steps	Content	Detail
7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.**
Understanding sampling	Understanding sampling	1	Recognizing and explaining the difference between a 'population' and a 'sample' selected from a population when collecting data	• recognize and explain the difference between a 'population' and a 'sample' selected from a population when collecting data
			Understanding the relationship between sample data and the entire population	• understand the relationship between a sample data and the entire population
		2	Understanding that random sampling tends to produce representative samples and support valid inferences	• understand that random sampling tends to produce representative samples and support valid inferences
7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
Drawing inferences from samples	Drawing inferences from samples	1	Generating multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions	• generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions
		2	Using samples to make predictions about a larger 'population' from which the sample comes	• use samples to make predictions about a larger 'population' from which the sample comes • discuss whether a prediction about a larger population, from which a sample comes, would be the same if a different sample were used
		3	Drawing inferences about a population from a random sample	• infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling

Draw informal comparative inferences about two populations.

Quest	Learning Journey	Steps	Content	Detail
7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
Comparing data distributions	Comparing data distributions	1	Informally assessing the degree of visual overlap of 2 numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability	• informally assess the degree of visual overlap of 2 numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team;-on a line plot, the separation between the 2 distributions of heights is noticeable

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Statistics & Probability
Draw informal comparative inferences about two populations.

Quest	Learning Journey	Steps	Content	Detail
7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.				
Drawing comparative inferences	Drawing comparative inferences	1	Using measures of center and measures of variability from random samples to draw informal comparative inferences about 2 populations	• use measures of center and measures of variability from random samples to draw informal comparative inferences about 2 populations

Investigate chance processes and develop, use, and evaluate probability models.

Quest	Learning Journey	Steps	Content	Detail
7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.				
Introducing probability	Introducing probability	1	Recognizing that a probability of 0 is for events that are impossible and a probability of 1 for events that are certain to occur	• recognize that a probability of 0 is for events that are impossible and a probability of 1 for events that are certain to occur
		2	Assigning numerical probabilities with their associated language	• assign language such as impossible, highly unlikely, unlikely, even chance, likely, highly likely and certain to the known probabilities of outcomes occurring • allocate words such as impossible, highly unlikely, unlikely, even chance, likely, highly likely and certain along a number line from 0 to 1 representing their respective probabilities
7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.				
Probability of chance events	Probability of chance events: relative frequency	1	Approximating the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency	• approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency
		2	Predicting the approximate relative frequency given the probability	• predict the approximate relative frequency given the probability, e.g., when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Statistics & Probability
Investigate chance processes and develop, use, and evaluate probability models.

Quest	Learning Journey	Steps	Content	Detail
7.SP.C.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
Probability models
7.SP.C.7.A Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
Determining the probability of events	Theoretical probability	1	Formally expressing the theoretical probability of an event	• express the theoretical probability of an event, given a number of equally likely outcomes in the sample space, as P(event) = number of favorable outcomes ÷ total number of outcomes • interpret and use probabilities expressed as fractions, percentages, or decimals • relate calculated probabilities with the language of chance and the likelihood number line • solve probability problems involving single-step experiments using cards, dice, spinners, etc
			Constructing single-step chance experiments	• use the term 'chance experiment' when referring to actions such as tossing a coin, rolling dice, or randomly selecting an object from a bag • use the term 'outcome' to describe a possible result of a chance experiment and list all of the possible outcomes for a single-step experiment • use the term 'sample space' to describe a list of all of the possible outcomes for a chance experiment • design a chance experiment given equally likely probabilities
	Predicting outcomes of chance experiments	1	Constructing single-step chance experiments	• predict outcomes of chance experiments • understand that experimental probability will be more accurate (become closer to the theoretical probability) with more trials
	Finding the complement of an event	1	Establishing that the sum of the probabilities of all of the possible outcomes of a single-step experiment is 1	• establish that the sum of the probabilities of all of the possible outcomes of a single-step experiment is 1
		2	Finding the complement of an event	• find the probability of the complement of an event by using the fact that the sum of the probabilities of an event and its complement is 1

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Statistics & Probability
Investigate chance processes and develop, use, and evaluate probability models.

Quest	Learning Journey	Steps	Content	Detail
7.SP.C.7.B Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.				
Observing frequencies in data	Finding the approximate probability	1	Developing a probability model (which may not be uniform) by observing frequencies in data generated from a chance process	• develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process
	Comparing observed frequency & expected frequency	1	Comparing observed frequencies with expected frequencies in chance experiments	• use the term 'frequency' to describe the number of times a particular outcome occurs in a chance experiment • distinguish between the 'frequency' of an outcome and the 'probability' of an outcome in a chance experiment • record and compare the expected frequencies of outcomes of chance experiments with observed frequencies, including where the outcomes are not equally likely • explain why observed frequencies of outcomes in chance experiments may differ from expected frequencies • recognize that some random generators have outcomes that are not equally likely and discuss the effect on expected outcomes

NWEA alignment
RIT SCORE BAND 222 - 226
Understanding Practice and Fluency (UPF)

Mathletics

Statistics & Probability
Investigate chance processes and develop, use, and evaluate probability models.

Quest	Learning Journey	Steps	Content	Detail
**7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.**
Probabilities of compound events
**7.SP.C.8.A Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.**
Probability: compound events	Investigating mutually exclusive events	1	Investigating mutually exclusive events	• describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and' • recognize the difference between mutually exclusive and non-mutually exclusive events • describe compound events using the terms 'at least', 'at most', 'not' and 'and' • pose problems that involve the use of these terms, and solve problems posed by others • describe the effect of the use of 'and' and 'or' when using internet search engines
	Calculating probabilities of compound events	1	Calculating probabilities of compound events	• calculate probabilities of compound events
**7.SP.C.8.B Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.**
Sample spaces for compound events	Representing sample spaces & identifying outcomes	1	Representing sample spaces for compound events using organized lists, tables, and tree diagrams	• represent sample spaces for compound events using organized lists, tables, and tree diagrams
		2	Identifying outcomes in a sample space that compose an event	• identify outcomes in a sample space that compose an event
**7.SP.C.8.C Design and use a simulation to generate frequencies for compound events.**
Independent & dependent compound events	independent/dependent compound events	1	Calculating the probability of independent and dependent compound events, including using tree diagrams and other representations, and knowing the underlying assumptions	• calculate the probability of independent and dependent compound events, including using tree diagrams and other representations, and know the underlying assumptions

NWEA alignment
RIT SCORE BAND 227 - 228
Understanding Practice and Fluency (UPF)

Statistics & Probability
Investigate patterns of association in bivariate data.

Quest	Learning Journey	Steps	Content	Detail
8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.				
Using and interpreting scatter plots	Using and interpreting scatter plots	1	Using and interpreting scatter plots of bivariate data	• draw estimated lines of best fit • make predictions • interpolate and extrapolate apparent trends whilst knowing the dangers of so doing • describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association
8.SP.A.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.				
Estimating the line of best fit	Estimating the line of best fit	1	Knowing that straight lines are widely used to model relationships between 2 quantitative variables. For scatter plots that suggest a linear association, informally fitting a straight line, and informally assessing the model fit by judging the closeness of the data points to the line	• Know that straight lines are widely used to model relationships between 2 quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line
8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.				
Interpreting the line of best fit	Interpreting the line of best fit	1	Using the equation of a linear model to solve problems in the context of bivariate measurement data	• use the equation of a linear model to solve problems in the context of bivariate measurement data • interpret the slope and y-intercept
8.SP.A.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.				
Two-way tables	Constructing and interpreting two-way tables	1	Constructing and interpreting a two-way table summarizing data on 2 categorical variables collected from the same subjects	• construct and interpret a two-way table summarizing data on 2 categorical variables collected from the same subjects • understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table • Use relative frequencies calculated for rows or columns to describe possible association between the 2 variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

Mathletics

For more information about Mathletics,
contact our friendly team.

www.mathletics.com/contact