

Mathletics

New Zealand Program of Studies

Skill Quests

Year 7 – 8

May, 2022

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Year 7

1 Number and Algebra

1.1 Number strategies and knowledge

Outcome	Quests	Content
NA4-1: Use a range of multiplicative strategies when operating on whole numbers.	Use numeracy strategies to multiply	Using numeracy strategies to multiply
	Use strategies to multiply/divide	Using strategies to multiply whole numbers
		Using standard algorithms to multiply
		Using strategies to divide whole numbers
		Using standard algorithms to divide
		Multiplying & dividing whole numbers in context
		Using the associative law for multiplication
		Using the commutative law for multiplication
		Testing for divisibility
	Find factors/multiples/primes up to 100	Finding factors of numbers up to 100
		Finding multiples of numbers up to 100
		Finding prime factors for numbers up to 100
	Add/subtract whole numbers	Adding/subtracting whole numbers
Use squares, cubes & roots	Finding squares and cubes	
	Finding square and cube roots	
Use index notation	Using index notation	
NA4-2: Understand addition and subtraction of fractions, decimals, and integers.	Add/subtract fractions	Add & subtract fractions - common denominator
		Add & subtract fractions - related denominator
	Add/subtract decimals	Adding & subtracting decimals
Add/subtract integers	Adding & subtracting integers	
NA4-3: Find fractions, decimals, and percentages of amounts expressed as whole numbers, simple fractions, and decimals.	Calculate fraction of a quantity	Calculating a fraction of a quantity
		Multiplying fractions by whole numbers
	Multiply fractions	Multiplying fractions

	Calculate decimals of a quantity	Calculating decimals of a quantity
	Multiply & divide decimals	Multiplying decimals
		Dividing decimals
	Calculate percentage of a quantity	Calculating a percentage of a quantity
		Calculating percentage discounts
		Calculating best buy amounts
	Multiply/divide integers	Calculating taxation: GST
Multiplying & dividing integers		
NA4-4: Apply simple linear proportions, including ordering fractions.	Order fractions, decimals & percentages	Ordering & comparing fractions
		Ordering & comparing decimals
		Ordering & comparing percentages
		Ordering fractions, decimals & percentages
	Order/compare integers	Ordering & comparing integers
	Use ratios/rates to solve problems	Investigating ratios
		Using ratios to solve problems
Using rates to solve problems		
NA4-5: Know the equivalent decimal and percentage forms for everyday fractions.	Calculate equivalent fractions	Calculating equivalent fractions
		Converting between mixed and improper fractions
	Convert fractions/decimals/percentages	Converting fractions to decimals
		Converting decimals to fractions
		Converting decimals to percentages
		Converting percentages to decimals
		Converting fractions to percentages
		Converting percentages to fractions
NA4-6: Know the relative size and place value structure of positive and negative integers and decimals to three places.	Recognise place value in decimals	Recognising place value in decimals
	Round decimals	Rounding decimals
	Use standard form	Using standard form for whole numbers

1.2 Equations and expressions

Outcome	Quests	Content
NA4-7: Form and solve simple linear equations.	Form & solve linear equations	Forming linear equations & expressions
		Using substitution to solve/check answers
		Solving linear equations using models
		Solving linear equations including non-integer solutions

1.3 Patterns and relationships

Outcome	Quests	Content
NA4-8: Generalise properties of multiplication and division with whole numbers.	Identify linear patterns	Identifying linear patterns
	Simplify algebraic expressions	Simplifying algebraic expressions
NA4-9: Use graphs, tables, and rules to describe linear relationships found in number and spatial patterns.	Use tables/graphs for linear patterns	Using tables to describe linear patterns
		Using graphs to describe linear patterns

2 Geometry and Measurement

2.1 Measurement

Outcome	Quests	Content
GM4-1: Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time.	Use metric units - length/mass/capacity	Using length units - km, m, cm, mm
		Using weight/mass units - kg, g, mg
		Using capacity/volume units - mL, L
		Recognise suitable units - length/mass/capacity
	Use other units of measurement	Measuring & using temperature
		Using different measures of time
GM4-2: Convert between metric units, using whole numbers and commonly used decimals.	Convert units - length/mass/capacity	Converting between metric units of length
		Converting between metric units of weight/mass
		Converting between metric units - capacity/volume
GM4-3: Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids.	Calculate perimeters of 2D shapes	Calculating perimeters of 2D shapes
	Calculate area of simple 2D shapes	Calculating area of rectangles
		Calculating area of triangles
		Calculating area of parallelograms
Calculate volume of prisms	Calculating volume of prisms	
GM4-4: Interpret and use scales, timetables, and charts.	Read scales & timetables in context	Reading scales & timetables to solve problems

2.2 Shape

Outcome	Quests	Content
GM4-5: Identify classes of two- and three-dimensional shapes by their geometric properties.	Classify 2D shapes by properties	Classifying triangles by their properties
		Classifying quadrilaterals by their properties
		Special triangles and quadrilaterals
	Identify parts of a circle	Identifying parts of a circle
	Identify & use angle properties	Identifying & using adjacent angles
		Supplementary angles
		Complementary angles

		Calculating angles of revolution
		Exploring vertically opposite angles
		Applying geometric reasoning
		Identifying parallel and perpendicular lines
	Identify regular/irregular prisms	Identifying regular and irregular prisms
GM4-6: Relate three-dimensional models to two-dimensional representations, and vice versa.	Connect prisms to nets	Connecting prisms to their nets
		Connecting prisms & pyramids to nets
		Connecting 3D objects to nets
	Connect prisms to 2D views	Connecting prisms & their 2D views

2.3 Position and orientation

Outcome	Quests	Content
GM4-7: Communicate and interpret locations and directions, using compass directions, distances, and grid references.	Use intercardinal compass directions	Using intercardinal compass directions
	Use scale drawings on maps	Using scale drawings on maps
	Use the Cartesian coordinate system	Using the Cartesian coordinate system

2.4 Transformations

Outcome	Quests	Content
GM4-8: Use the invariant properties of figures and objects under transformations (reflection, rotation, translation, or enlargement).	Perform a range of transformations	Using the language of transformations
		Performing reflections & identifying line symmetry
		Perform rotations & identify rotational symmetry
		Performing translations
		Performing enlargements & identify scale factors

3 Statistics

3.1 Statistical investigation

Outcome	Quests	Content
S4-1: Plan and conduct investigations using the statistical enquiry cycle: determining appropriate variables and data collection methods; gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships, and trends; comparing distributions visually; communicating findings, using appropriate displays.	Setup statistical investigations	Setting up statistical investigations
	Calculate measures of middle & spread	Calculate central tendency: mean, median, mode
		Calculating the spread - range
	Display data on graphs	Displaying data sets on a variety of graphs
	Interpret results & displays	Interpreting results & displays
		Representing stem and leaf graphs
		Interpreting pie charts
		Introducing box-and-whisker plots
Interpreting histograms		
Comparing displays		
Drawing conclusions to answer the question		

3.2 Statistical literacy

Outcome	Quests	Content
S4-2: Evaluate statements made by others about the findings of statistical investigations and probability activities.	Interpret secondary data	Interpreting secondary data
		Looking for misleading information

3.3 Probability

Outcome	Quests	Content
S4-3: Investigate situations that involve elements of chance by comparing experimental distributions with expectations from models of the possible outcomes, acknowledging variation and independence.	Probability - theoretical/experimental	Using the language of probability
		Calculating probabilities
		Using theoretical probability
		Using experimental probability
S4-4: Use simple fractions and percentages to describe probabilities.	Use frac/dec & percentages in chance	Using frac/dec & percentages in probability

Year 8

1 Number and Algebra

1.1 Number strategies and knowledge

Outcome	Quests	Content	
NA4-1: Use a range of multiplicative strategies when operating on whole numbers.	Use numeracy strategies to multiply	Using numeracy strategies to multiply	
	Use strategies to multiply whole numbers	Use mental & written strategies to multiply	
	Use strategies to divide whole numbers	Using strategies to divide whole numbers	
	Use the laws of multiplication	Using the laws of multiplication	
	Find factors/multiples/primes up to 144		Finding factors of numbers up to 144
			Finding multiples of numbers up to 144
			Using prime factors for numbers up to 144
	Use squares, cubes & roots		Using squares, cubes & roots
			Finding roots of higher powers
	Use index notation & factorials		Using index notation
Applying index laws			
Introducing factorials			
NA4-2: Understand addition and subtraction of fractions, decimals, and integers.	Add & subtract fractions	Adding & subtracting fractions	
		Add & subtract with mixed numbers	
	Add & subtract decimals	Adding & subtracting decimals	
	Add & subtract integers	Adding & subtracting integers	
Add rational numbers	Adding rational numbers		
NA4-3: Find fractions, decimals, and percentages of amounts expressed as whole numbers, simple fractions, and decimals.	Calculate a fraction of a quantity	Calculating a fraction of a quantity	
	Multiply/divide fractions & decimals	Multiplying fractions	
		Dividing fractions	
		Dividing decimals	
	Calculate a percentage of a quantity	Calculating a percentage of a quantity	
		Calculating discounts and best buys	
		Calculating taxation: GST	
Compare quantities as a percentage	Comparing quantities as a percentage		

		Multiplying & dividing integers
NA4-4: Apply simple linear proportions, including ordering fractions.	Order fractions/decimals/percentages	Order/compare proper fractions
		Order/compare mixed & improper fractions
		Ordering & comparing decimals
		Ordering fractions, decimals & percentages
		Order integers
		Ordering & comparing integers
	Order rational numbers	Ordering rational numbers
Use ratios to solve problems	Simplifying ratios	
	Using ratios to solve problems	
NA4-5: Know the equivalent decimal and percentage forms for everyday fractions.	Calculate equivalent fractions	Calculating equivalent fractions
		Converting between mixed & improper fractions
	Convert fractions/decimals/percentages	Converting fractions to decimals
		Converting decimals to fractions
		Converting decimals to percentages
		Converting percentages to decimals
		Converting fractions to percentages
		Converting percentages to fractions
Connecting fractions, decimals & percentages		
NA4-6: Know the relative size and place value structure of positive and negative integers and decimals to three places.	Round decimals	Rounding decimals
	Use standard form	Using standard form

1.2 Equations and expressions

Outcome	Quests	Content
NA4-7: Form and solve simple linear equations.	Form & solve linear equations	Forming linear equations
		Solving 1 step linear equations
		Solving 2 step linear equations
		Working with linear equations

1.3 Patterns and relationships

Outcome	Quests	Content
NA4-8: Generalise properties of multiplication and division with whole numbers.	Identify linear patterns	Identifying linear patterns
	Simplify algebraic expressions	Simplifying algebraic expressions
NA4-9: Use graphs, tables, and rules to describe linear relationships found in number and spatial patterns.	Use tables/graphs for linear patterns	Using tables to describe linear patterns
		Using graphs to describe linear patterns

2 Geometry and Measurement

2.1 Measurement

Outcome	Quests	Content
GM4-1: Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time.	Use metric units - length/mass/capacity	Using length units - km, m, cm, mm
	Use units for time	Large and small time intervals
		Converting units of time
GM4-2: Convert between metric units, using whole numbers and commonly used decimals.	Convert units: length/mass/capacity/area	Converting between different metric units - length
		Converting between metric units of weight/mass
		Converting between metric units of capacity/volume
		Converting between units of area
GM4-3: Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids.	Find perimeters of composite shapes	Calculating perimeters of composite shapes
	Calculate areas incl composite shapes	Calculating area of rectangles
		Calculating area of triangles
		Calculating area of parallelograms
		Calculating area of composite shapes
Calculate volume of prisms	Calculating volume of prisms	
GM4-4: Interpret and use scales, timetables, and charts.	Read scales & timetables in context	Reading scales & timetables to solve problems

2.2 Shape

Outcome	Quests	Content
GM4-5: Identify classes of two- and three-dimensional shapes by their geometric properties.	Classify 2D shapes by properties	Classifying quadrilaterals by their properties
		Identifying & using angle properties of triangles
		Identify/use angle properties of quadrilaterals
		Identifying angle properties of regular polygons
	Use parallel line rules	Identifying & using parallel line rules
Using angle relationships - parallel lines		

GM4-6: Relate three-dimensional models to two-dimensional representations, and vice versa.	Connect prisms to 2D views/cross-section	Connecting prisms & their 2D views
		Identifying cross-sections of prisms

2.3 Position and orientation

Outcome	Quests	Content
GM4-7: Communicate and interpret locations and directions, using compass directions, distances, and grid references.	Use compass/true bearings	Using compass & true bearings
	Use scale drawings on maps	Using scale drawings on maps
	Use the Cartesian coordinate system	Using the Cartesian coordinate system

2.4 Transformations

Outcome	Quests	Content
GM4-8: Use the invariant properties of figures and objects under transformations (reflection, rotation, translation, or enlargement).	Perform a range of transformations	Performing reflections
		Performing rotations
		Performing enlargements & identify scale factors
		Use a combination of transformations & in context

3 Statistics

3.1 Statistical investigation

Outcome	Quests	Content
S4-1: Plan and conduct investigations using the statistical enquiry cycle: determining appropriate variables and data collection methods; gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships, and trends; comparing distributions visually; communicating findings, using appropriate displays.	Setup statistical investigations	Setting up statistical investigations
	Calculate measures of middle & spread	Calculate the central tendency - mean, median, mode
		Calculating the spread - range, IQR
		Calculating statistics to describe data
	Display data on graphs	Constructing frequency histograms & polygons
		Constructing dot plots
		Constructing stem and leaf plots
		Constructing box and whisker plots
	Interpret results & displays	Interpreting bar graphs & histograms
		Interpreting dot plots
		Interpreting stem and leaf graphs
		Interpreting line graphs
		Interpreting box-and-whisker plots
		Interpreting data in various displays
Drawing conclusions to answer the investigation		
Recognising sampling variation		

3.2 Statistical literacy

Outcome	Quests	Content
S4-2: Evaluate statements made by others about the findings of statistical investigations and probability activities.	Interpret secondary data	Interpreting secondary data
		Looking for misleading information

3.3 Probability

Outcome	Quests	Content
S4-3: Investigate situations that involve elements of chance by comparing experimental distributions with expectations from models of the possible outcomes, acknowledging variation and independence.	Probability - theoretical/experimental	Understanding the language of probability
		Understanding theoretical probability
S4-4: Use simple fractions and percentages to describe probabilities.	Use frac/dec & percentages in chance	Using frac/dec & percentages in probability

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