

Subtest Topic Descriptions

The concepts and skills covered by the KeyMaths–3 DA subtest topics are described below:

BASIC CONCEPTS

Numeration

Early number awareness

Explores:

- performing rote and rational counting,
- representing, comparing and ordering rational numbers to 99,
- performing skip counting, and
- identifying unitary fractions (e.g., half).

Place value and number sense

Explores:

- using concepts of place value when representing, comparing, ordering, estimating and rounding multidigit numbers, and
- renaming numbers.

Magnitude of numbers

Explores:

- comparing and rounding numbers into the trillions, and
- using powers of ten and scientific notation to record large numbers.

Fractions

Explores:

- representing, estimating, ordering, comparing, and simplifying fractions, and
- determining equivalent fractions and associating fractions with equivalent decimals and percentages.

Decimals

Explores:

- representing, comparing, ordering, estimating, and rounding decimals, and
- associating fractions with equivalent decimals and percentages.

Percentages

Explores:

- identifying, representing, estimating, and comparing percentages, and
- associating percentages with fractions and decimals.

Exponents, integers, multiples, and factors

Explores:

- using powers and square roots to represent numbers,
- comparing and ordering positive and negative integers, and
- identifying factors, prime factors, and using factor trees.

BASIC CONCEPTS

Algebra

Early algebraic awareness

Explores:

- classifying and ordering elements by attributes,
- generalising from given conditions,
- recognising and describing a variety of simple geometric and numeric patterns,
- using symbols and algebraic notations, and
- solving for unknowns.

Algebraic uses of numbers and geometry

Explores:

- continuing with classification of objects,
- continuing with analysis of numeric and geometric patterns and functions,
- translating among symbolic, numeric, and pictorial representations or number relationships, and
- using operational properties, order of operations and related symbolism to compute with whole and rational numbers.

Symbolic representation

Explores:

- appreciating the precision of symbolic representation,
- working with variables, expressions, equations, inequalities and interrelationships between representations,
- factoring expressions and polynomials, and
- computing with whole numbers, rational numbers, integers, exponents, and polynomials.

Ratio and proportion

Explores:

- recognising variability in simple functional relationships,
- examining the relationship between fractions and reciprocals,
- examining the concept of ratio and equivalent ratios, and
- examining linear relationships.

Coordinate graphing

Explores:

- using graphs to explore situations involving equalities and inequalities,
- working with intercepts and slopes of lines, and
- addressing situations with constant or varying rate of change.

BASIC CONCEPTS

Geometry

Early geometric awareness

Explores:

- using terms to describe vertical and horizontal relationships,
- identifying, describing, and comparing plane figures and solids,
- identifying similarities and differences between shapes, and
- examining part/whole relationships, and
- investigating perspectives of common objects.

Two-dimensional shapes

Explores:

- describing and classifying plane figures,
- identifying and constructing congruent and similar figures and figures with line and rotational symmetry,
- manipulating shapes by sliding and turning them, and
- working with spatial visualisation.

Three-dimensional shapes

Explores:

- identifying, describing, constructing, comparing, and classifying three-dimensional solids,
- working with perspectives of three-dimensional solids, and
- working with spatial visualisation.

Lines and angles

Explores:

- recognising points, line segments, rays, lines, parallel lines, perpendicular lines, and intersections,
- measuring, and classifying angles, and
- examining relationships such as adjacent, complimentary, and vertical angles.

Formulas

Explores:

- using formulas to determine perimeter and area of plane figures,
- using formulas to determine volume of three-dimensional shapes, and
- using the Pythagorean theorem.

Grids and coordinate planes

Explores:

- locating positions in a rectangular grid,
- using ordered pairs to locate points, and
- using points in a plane to examine scaling, orientation, and direction.

BASIC CONCEPTS

Measurement

Early awareness of measurement

Explores:

- comparing and ordering of objects by height, length, size, mass, and capacity,
- identifying the passage of time, and
- identifying notes and coins and their value.

Standard units

Explores:

- selecting and using appropriate standard units to estimate and measure given heights, lengths, distances, masses, capacity, and volume.

Time

Explores:

- using calendars and telling time.

Money

Explores:

- making coin combinations to one dollar and combining notes and coins to one hundred dollars, and
- making appropriate change.

BASIC CONCEPTS

Data Analysis and Probability

Early awareness of data and probability

Explores:

- interpreting data using objects, tally charts, frequency tables, line plots, tables, picture graphs, and bar graphs, and
- recognising situations with equal and unequal chance and outcomes that exist in situations of unequal chance.

Charts, tables, and graphs

Explores:

- interpreting data using charts, tables, picture graphs with keys, and bar graphs with scales to represent the relationship of quantities, and
- interpreting data with one or more variables using charts, tables, and graphs, including line graphs and pie graphs.

Graphical representation

Explores:

- recognising the distinction between discrete and continuous data, and
- using line, stem and leaf, box, and scatter plots, and histograms.

Statistics

Explores:

- identifying characteristics of representative samples and associating samples with the populations they represent,
- determining measures of central tendency and dispersion,
- recognising the desirability of specific measures of central tendency in given situations, and
- identifying the median for given data.

Probability

Explores:

- analysing the relationship between actions and consequences in real-life situations,
- predicting probabilities for independent, dependent, and compound events, and
- determining the theoretical outcomes for situations involving permutations and combinations.

OPERATIONS

Mental Computation and Estimation

Early awareness of mental computation

Explores:

- adding and subtracting one-digit numbers,
- answering computation chains involving addition and subtraction,
- using strategies involving place value and compatible numbers to mentally compute two-digit sums and differences, and
- using a front-end strategy and approximations to estimate two-digit sums and differences.

Mental computation chains

Explores:

- answering computation chains involving addition and subtraction, and
- answering computation chains involving all operations.

Mental computation with whole numbers

Explores:

- adding and subtracting using place value and strategies to simplify mental computations, and
- multiplying and dividing using strategies and properties to simplify computations.

Mental computation with rational numbers

Explores:

- using strategies to simplify mental computation involving the addition and subtraction of rational numbers, and
- using strategies to simplify mental computation involving the multiplication and division of rational numbers.

Estimation and whole numbers

Explores:

- using strategies such as front end, rounding, and clustering to estimate sums and differences, and
- using strategies such as front end, rounding, and compatible numbers to estimate products and quotients.

Estimation and rational numbers

Explores:

- estimating sums and differences involving rational numbers, and
- estimating products and quotients involving rational numbers.

OPERATIONS

Addition and Subtraction

Algorithms to add and subtract whole numbers

Explores:

- adding and subtracting numbers with regrouping, and
- adding and subtracting multidigit numbers.

Algorithms to add and subtract rational numbers

Explores:

- adding and subtracting decimals values, fractions, and mixed numbers.

Integers

Explores:

- adding and subtracting integers.

Algebra

Explores:

- adding and subtracting monomials and polynomials.

OPERATIONS

Multiplication and Division

Algorithms to multiply and divide whole numbers

Explores:

- multiplying and dividing without regrouping,
- dividing by one-digit divisors with regrouping, and
- multiplying and dividing with one-digit and two-digit multipliers and divisors.

Algorithms to multiply and divide rational numbers

Explores:

- multiplying and dividing decimal values, fractions, and mixed numbers.

Integers

Explores:

- multiplying and dividing integers.

Algebra

Explores:

- multiplying and dividing monomials and polynomials.

APPLICATIONS

Foundations of Problem Solving

Analysis of problems

Explores:

- recognising whether sufficient information is present to solve given problems,
- identifying operations needed in the solution of given problems, and
- identifying relationships in the relevant information.

Word problems

Explores:

- creating word problems that match given situations,
- creating word problems derived from information taken from charts, tables, and graphs, and
- creating clues for problem situations.

Problem-solving strategies

Explores:

- identifying and describing strategies that would address problems.

APPLICATIONS

Applied Problem Solving

Numeration

Explores:

- applying number sense and estimation skills,
- working with fractions, decimals, and percents,
- using factors, multiples, prime factorisation, and prime numbers,
- using inverse relationships between operations to simplify computations, and
- selecting appropriate methods and tools to solve problems.

Algebra

Explores:

- drawing inferences and conclusions to solve problems,
- solving complex equations and inequalities, analysing patterns and functions using concrete models, words, tables, and graphs,
- solving problems involving ratio and proportion,
- using charts, tables, graphs, and equations to solve real-world problems, and
- using algebraic and geometric representations and formulas to solve problems.

Geometry

Explores:

- solving problems concerning congruence and similarity,
- determining locations and paths using mapping and coordinate systems,
- solving problems involving the relationship between two-dimensional and three-dimensional objects,
- using visualisation and formulas to solve problems involving perimeter, area, and volume,
- using geometric models to represent and explain algebraic relationships, and
- applying geometric ideas to everyday life.

Measurement

Explores:

- making decisions about units and degree of precision that is appropriate for problem situations,
- applying strategies for estimating and determining the perimeters, areas, surface areas and volumes in irregular shapes and real-life situations, and
- solving problems involving ratio and proportion, time, and money management.

Data Analysis and Probability

Explores:

- selecting investigations to address given problems and selecting appropriate samples and data collection procedures,
- comparing different representations of the same data,
- solving problems involving sets of related data,
- interpreting real-life data,
- developing and evaluating inferences and generalisations based on data, and
- applying concepts of probability to real-life situations.