Mathematics K to 7 IRP: Prescribed Learning Outcomes

Mathematical Processes (Integrated)
The following mathematical processes have been integrated within the prescribed learning outcomes and achievement indicators for all grades: communication [C], connections [CN], mental mathematics and estimation [ME], problem solving [PS], reasoning [R], technology [T], and visualization [V].

Number

Kindergarten
- A1 say the number sequence by 1s starting anywhere from 1 to 10 and from 10 to 1 [C, CN, V]
- A2 recognize, at a glance, and name familiar arrangements of 1 to 5 objects or dots [C, CN, ME, V]
- A3 relate a numeral, 1 to 10, to its respective quantity [CN, R, V]
- A4 represent and describe numbers 2 to 10, concretely and pictorially [C, CN, ME, R, V]
- A5 compare quantities, 1 to 10, using one-to-one correspondence [C, CN, V]

Grade 1
- A1 say the number sequence, 0 to 100, by
  - 1s forward and backward between any two given numbers
  - 2s to 20, forward starting at 0
  - 5s and 10s to 100, forward starting at 0 [C, CN, V, ME]
- A2 recognize, at a glance, and name familiar arrangements of 1 to 10 objects or dots [C, CN, ME, V]
- A3 demonstrate an understanding of counting by
  - indicating that the last number said identifies "how many"
  - showing that any set has only one count
  - using the counting on strategy
  - using parts or equal groups to count sets [C, CN, ME, R, V]
- A4 represent and describe numbers to 20 concretely, pictorially, and symbolically [C, CN, V]
- A5 compare sets containing up to 20 elements to solve problems using
  - referents
  - one-to-one correspondence [C, CN, ME, PS, R, V]
- A6 estimate quantities to 20 by using referents [C, ME, PS, R, V]
- A7 demonstrate, concretely and pictorially, how a given number can be represented by a variety of equal groups with and without singles [C, R, V]
- A8 identify the number, up to 20, that is one more, two more, one less, and two less than a given number. [C, CN, ME, R, V]
- A9 demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially, and symbolically by
  - using familiar and mathematical language to describe additive and subtractive actions from their experience
  - creating and solving problems in context that involve addition and subtraction
  - modelling addition and subtraction using a variety of concrete and visual representations, and recording the process symbolically [C, CN, ME, PS, R, V]
- A10 describe and use mental mathematics strategies (memorization not intended), such as
  - counting on and counting back
  - making 10
  - doubles
  - using addition to subtract
  to determine the basic addition facts to 18 and related subtraction facts [C, CN, ME, PS, R, V]

Grade 2
- A1 say the number sequence from 0 to 100 by
  - 2s, 5s and 10s, forward and backward, using starting points that are multiples of 2, 5, and 10 respectively
  - 10s using starting points from 1 to 9
  - 2s starting from 1 [C, CN, ME, R]
- A2 demonstrate if a number (up to 100) is even or odd [C, CN, PS, R]
- A3 describe order or relative position using ordinal numbers (up to tenth) [C, CN, R]
- A4 represent and describe numbers to 100, concretely, pictorially, and symbolically [C, CN, V]
- A5 compare and order numbers up to 100 [C, CN, R, V]
- A6 estimate quantities to 100 using referents [C, ME, PS, R]
- A7 illustrate, concretely and pictorially, the meaning of place value for numerals to 100 [C, CN, R, V]
- A8 demonstrate and explain the effect of adding zero to or subtracting zero from any number [C, R]
- A9 demonstrate an understanding of addition (limited to 1 and 2-digit numerals) with answers to 100 and the corresponding subtraction by
  - using personal strategies for adding and subtracting with and without the support of manipulatives
  - creating and solving problems that involve addition and subtraction
  - explaining that the order in which numbers are added does not affect the sum
  - explaining that the order in which numbers are subtracted may affect the difference [C, CN, ME, PS, R, V]
- A10 apply mental mathematics strategies, such as
  - using doubles
  - making 10
  - one more, one less
  - two more, two less
  - building on a known double
  - addition for subtraction
  to determine basic addition facts to 18 and related subtraction facts [C, CN, ME, R, V]

Grade 3
- A1 say the number sequence forward and backward from 0 to 1000 by
  - 5s, 10s or 100s using any starting point
  - 3s using starting points that are multiples of 3
  - 4s using starting points that are multiples of 4
  - 25s using starting points that are multiples of 25 [C, CN, ME]
- A2 represent and describe numbers to 1000, concretely, pictorially, and symbolically [C, CN, V]
- A3 compare and order numbers to 1000 [CN, R, V]
- A4 estimate quantities less than 1000 using referents [ME, PS, R, V]
- A5 illustrate, concretely and pictorially, the meaning of place value for numerals to 1000 [C, CN, R, V]
- A6 describe and apply mental mathematics strategies for adding two 2-digit numerals, such as
  - adding from left to right
  - taking one addend to the nearest multiple of ten and then compensating
  - using doubles [C, ME, PS, R, V]
- A7 describe and apply mental mathematics strategies for subtracting two 2-digit numerals, such as
  - taking the subtrahend to the nearest multiple of ten and then compensating
  - thinking of addition
  - using doubles [C, ME, PS, R, V]
- A8 apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem-solving context [C, ME, PS, R]
- A9 demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1, 2 and 3-digit numerals) by
  - using personal strategies for adding and subtracting with and without the support of manipulatives
  - creating and solving problems in context that involve addition and subtraction of numbers concretely, pictorially, and symbolically [C, CN, ME, PS, R]
- A10 apply mental mathematics strategies and number properties, such as
  - using doubles
  - making 10
  - using the commutative property
  - using the property of zero
  - thinking addition for subtraction
  to recall basic addition facts to 18 and related subtraction facts [C, CN, ME, R, V]
- A11 demonstrate an understanding of multiplication to 5 × 5 by
  - representing and explaining multiplication using equal grouping and arrays
  - creating and solving problems in context that involve multiplication
  - modelling multiplication using concrete and visual representations, and recording the process symbolically
  - relating multiplication to repeated addition
  - relating multiplication to division [C, CN, PS, R]
- A12 demonstrate an understanding of division by
  - representing and explaining division using equal sharing and equal grouping
  - creating and solving problems in context that involve equal sharing and equal grouping
  - modelling equal sharing and equal grouping using concrete and visual representations, and recording the process symbolically
  - relating division to repeated subtraction
  - relating division to multiplication
  (limited to division related to multiplication facts up to 5 × 5) [C, CN, PS, R]
- A13 demonstrate an understanding of fractions by
  - explaining that a fraction represents a part of a whole
  - describing situations in which fractions are used
  - comparing fractions of the same whole with like denominators [C, CN, ME, R, V]

Grade 4
- A1 represent and describe whole numbers to 10,000, pictorially, and symbolically [C, CN, V]
- A2 compare and order numbers to 10,000 [C, CN]
- A3 demonstrate an understanding of addition of numbers with answers to 10,000 and their corresponding subtractions (limited to 3 and 4-digit numerals) by
  - using personal strategies for adding and subtracting
  - estimating sums and differences
  - solving problems involving addition and subtraction [C, CN, ME, PS, R]
- A4 explain the properties of 0 and 1 for multiplication, and the property of 1 for division [C, CN, R]
- A5 describe and apply mental mathematics strategies, such as
  - skip counting from a known fact
  - using doubling or halving
  - using doubling or halving and adding or subtracting one more group
  - using patterns in the 9s facts
  - using repeated doubling
  to determine basic multiplication facts to 9 × 9 and related division facts [C, CN, ME, PS, R]
- A6 demonstrate an understanding of multiplication (2- or 3-digit by 1-digit) to solve problems by
  - using personal strategies for multiplication with and without concrete materials
  - using arrays to represent multiplication
  - connecting concrete representations to symbolic representations
  - estimating products [C, CN, ME, PS, R, V]
- A7 demonstrate an understanding of division (1-digit divisor and up to 2-digit dividend) to solve problems by
  - using personal strategies for dividing with and without concrete materials
  - estimating quotients
  - relating division to multiplication [C, CN, ME, PS, R, V]
- A8 demonstrate an understanding of fractions less than or equal to one by using concrete and pictorial representations to
  - name and record fractions for the parts of a whole or a set
  - compare and order fractions
  - model and explain that for different wholes, two identical fractions may not represent the same quantity
  - provide examples of where fractions are used [C, CN, PS, R, V]
- A9 describe and represent decimals (tenths and hundredths) concretely, pictorially, and symbolically [C, CN, R, V]
- A10 relate decimals to fractions (to hundredths) [CN, R, V]
- A11 demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by
  - using compatible numbers
  - estimating sums and differences
  - using mental math strategies
  to solve problems [C, ME, PS, R, V]

Grade 5
- A1 represent and describe whole numbers to 1,000,000 [C, CN, V, T]
- A2 use estimation strategies including
  - front-end rounding
  - compensation
  - compatible numbers
  in problem-solving contexts [C, CN, ME, PS, R, V]
- A3 apply mental mathematics strategies and number properties, such as
  - skip counting from a known fact
  - using doubling or halving
  - using patterns in the 9s facts
  - using repeated doubling or halving
  to determine answers for basic multiplication facts to 81 and related division facts [C, CN, ME, R, V]
- A4 apply mental mathematics strategies for multiplication, such as
  - annexing then adding zero
  - halving and doubling
  - using the distributive property [C, ME, R]
- A5 demonstrate an understanding of multiplication (2-digit by 2-digit) to solve problems [C, CN, PS, V]
- A6 Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit) and interpret remainders to solve problems [C, CN, PS]
- A7 demonstrate an understanding of fractions by using concrete and pictorial representations to
  - create sets of equivalent fractions
  - compare fractions with like and unlike denominators [C, CN, PS, R, V]
- A8 describe and represent decimals (tenths, hundredths, thousandths) concretely, pictorially, and symbolically [C, CN, R, V]
- A9 relate decimals to fractions (to thousandths) [CN, R, V]
- A10 compare and order decimals (to thousandths) by using
  - benchmarks
  - place value
  - equivalent decimals [CN, R, V]
- A11 demonstrate an understanding of addition and subtraction of decimals (limited to thousandths) [C, CN, PS, R, V]

Grade 6
- A1 demonstrate an understanding of place value for numbers
  - greater than one million
  - less than one thousandth [C, CN, R, T]
- A2 solve problems involving large numbers, using technology [ME, PS, T]
- A3 demonstrate an understanding of factors and multiples by
  - determining multiples and factors of numbers less than 100
  - identifying prime and composite numbers
  - solving problems involving multiples [PS, R, V]
- A4 relate improper fractions to mixed numbers [CN, ME, R, V]
- A5 demonstrate an understanding of ratio, concretely, pictorially, and symbolically [C, CN, PS, R, V]
- A6 demonstrate an understanding of percent (limited to whole numbers) concretely, pictorially, and symbolically [C, CN, PS, R, V]
- A7 demonstrate an understanding of integers, concretely, pictorially, and symbolically [C, CN, R, V]
- A8 demonstrate an understanding of multiplication and division of decimals (1-digit whole number multipliers and 1-digit natural number divisors) [C, CN, ME ,PS, R, V]
- A9 explain and apply the order of operations, excluding exponents, with and without technology (limited to whole numbers) [CN, ME, PS, T]

Grade 7
- A1 determine and explain why a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10 and why a number cannot be divided by 0 [C, R]
- A2 demonstrate an understanding of the addition, subtraction, multiplication, and division of decimals (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected) to solve problems [ME, PS, T]
- A3 solve problems involving percents from 1% to 100% [C, CN, PS, R, T]
- A4 demonstrate an understanding of the relationship between positive repeating decimals and positive fractions, and positive terminating decimals and positive fractions [C, CN, R, T]
- A5 demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially, and symbolically (limited to positive sums and differences) [C, CN, ME, PS, R, V]
- A6 demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically [C, CN, PS, R, V]
- A7 compare and order positive fractions, positive decimals (to thousandths) and whole numbers by using
  - benchmarks
  - place value
  - equivalent fractions and/or decimals [CN, R, V]

Patterns and Relations

Patterns

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
	B1 demonstrate an understanding of repeating patterns (two or three elements) by • identifying • reproducing • extending • creating patterns, using manipulatives, sounds, and actions [C, CN, PS, V]	B1 demonstrate an understanding of repeating patterns (two to four elements) by • describing • reproducing • extending • creating patterns using manipulatives, diagrams, sounds, and actions [C, PS, R, V] B2 translate repeating patterns from one representation to another [C, R, V]	B1 demonstrate an understanding of repeating patterns (three to five elements) by • describing • extending • comparing • creating patterns using manipulatives, diagrams, sounds, and actions [C, CN, PS, R, V] B2 demonstrate an understanding of increasing patterns by • describing • reproducing • extending • creating patterns using manipulatives, diagrams, sounds, and actions (numbers to 100) [C, CN, PS, R, V]	B1 demonstrate an understanding of increasing patterns by • describing • extending • comparing • creating patterns using manipulatives, diagrams, sounds, and actions (numbers to 1000) [C, CN, PS, R, V] B2 demonstrate an understanding of decreasing patterns by • describing • extending • comparing • creating patterns using manipulatives, diagrams, sounds, and actions (numbers to 1000) [C, CN, PS, R, V]	B1 identify and describe patterns found in tables and charts, including a multiplication chart [C, CN, PS, V] B2 reproduce a pattern shown in a table or chart using concrete materials [C, CN, V] B3 represent and describe patterns and relationships using charts and tables to solve problems [C, CN, PS, R, V] B4 identify and explain mathematical relationships using charts and diagrams to solve problems [CN, PS, R, V]	B1 determine the pattern rule to make predictions about subsequent elements [C, CN, PS, R, V]	B1 demonstrate an understanding of the relationships within tables of values to solve problems [C, CN, PS, R] B2 represent and describe patterns and relationships using graphs and tables [C, CN, ME, PS, R, V]	B1 demonstrate an understanding of oral and written patterns and their equivalent linear relations [C, CN, R] B2 create a table of values from a linear relation, graph the table of values, and analyze the graph to draw conclusions and solve problems [C, CN, R, V]

Variables and Equations

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
		B3 describe equality as a balance and inequality as an imbalance, concretely, and pictorially (0 to 20) [C, CN, R, V] B4 record equalities using the equal symbol [C, CN, PS, V]	B3 demonstrate and explain the meaning of equality and inequality by using manipulatives and diagrams (0 to 100) [C, CN, R, V] B4 record equalities and inequalities symbolically using the equal symbol or the not equal symbol [C, CN, R, V]	B3 solve one-step addition and subtraction equations involving symbols representing an unknown number [C, CN, PS, R, V]	B5 express a given problem as an equation in which a symbol is used to represent an unknown number [CN, PS, R] B6 solve one-step equations involving a symbol to represent an unknown number [C, CN, PS, R, V]	B2 solve problems involving single-variable, one-step equations with whole number coefficients and whole number solutions [C, CN, PS, R]	B3 represent generalizations arising from number relationships using equations with letter variables. [C, CN, PS, R, V] B4 demonstrate and explain the meaning of preservation of equality concretely, pictorially and symbolically [C, CN, PS, R, V]	B3 demonstrate an understanding of preservation of equality by • modelling preservation of equality concretely, pictorially, and symbolically • applying preservation of equality to solve equations [C, CN, PS, R, V] B4 explain the difference between an expression and an equation [C, CN] B5 evaluate an expression given the value of the variable(s) [CN, R] B6 model and solve problems that can be represented by one-step linear equations of the form $x + a = b$, concretely, pictorially, and symbolically, where a and b are integers [CN, PS, R, V] B7 model and solve problems that can be represented by linear equations of the form • $ax + b = c$ • $ax = b$ • $\frac{x}{a} = b, a \neq 0$ concretely, pictorially, and symbolically, where a, b, and c are whole numbers [CN, PS, R, V]

Mathematics K to 7 IRP: Prescribed Learning Outcomes

Mathematical Processes (Integrated)
The following mathematical processes have been integrated within the prescribed learning outcomes and achievement indicators for all grades: communication [C], connections [CN], mental mathematics and estimation [ME], problem solving [PS], reasoning [R], technology [T], and visualization [V].

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
Shape and Space — Measurement	C1 use direct comparison to compare two objects based on a single attribute such as length (height), mass (weight), and volume (capacity) [C, CN, PS, R, V]	C1 demonstrate an understanding of measurement as a process of comparing by • identifying attributes that can be compared • ordering objects • making statements of comparison • filling, covering, or matching [C, CN, PS, R, V]	C1 relate the number of days to a week and the number of months to a year in a problem-solving context [C, CN, PS, R] C2 relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight) [C, CN, ME, R, V] C3 compare and order objects by length, height, distance around, and mass (weight) using non-standard units, and make statements of comparison [C, CN, ME, R, V] C4 measure length to the nearest non-standard unit by • using multiple copies of a unit • using a single copy of a unit (iteration process) [C, ME, R, V] C5 demonstrate that changing the orientation of an object does not alter the measurements of its attributes [C, R, V]	C1 relate the passage of time to common activities using non-standard and standard units (minutes, hours, days, weeks, months, years) [CN, ME, R] C2 relate the number of seconds to a minute, the number of minutes to an hour, and the number of days to a month in a problem-solving context [C, CN, PS, R, V] C3 demonstrate an understanding of measuring length (cm, m) by • selecting and justifying referents for the units cm and m • modelling and describing the relationship between the units cm and m • estimating length using referents • measuring and recording length, width, and height [C, CN, ME, PS, R, V] C4 demonstrate an understanding of measuring mass (g, kg) by • collecting and justifying referents for the units g and kg • modelling and describing the relationship between the units g and kg • estimating mass using referents • measuring and recording mass [C, CN, ME, PS, R, V] C5 demonstrate an understanding of perimeter of regular and irregular shapes by • estimating perimeter using referents for centimetre or metre • measuring and recording perimeter (cm, m) • constructing different shapes for a given perimeter (cm, m) to demonstrate that many shapes are possible for a perimeter [C, ME, PS, R, V]	C1 read and record time using digital and analog clocks, including 24-hour clocks [C, CN, V] C2 read and record calendar dates in a variety of formats [C, V] C3 demonstrate an understanding of area of regular and irregular 2-D shapes by • recognizing that area is measured in square units • selecting and justifying referents for the units cm^2 or m^2 • estimating area by using referents for cm^2 or m^2 • determining and recording area (cm^2 or m^2) • constructing different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area [C, CN, ME, PS, R, V]	C1 design and construct different rectangles given either perimeter or area, or both (whole numbers) and draw conclusions [C, CN, PS, R, V] C2 demonstrate an understanding of measuring length (mm) by • selecting and justifying referents for the unit mm • modelling and describing the relationship between mm and cm units, and between mm and m units [C, CN, ME, PS, R, V] C3 demonstrate an understanding of volume by • selecting and justifying referents for cm^3 or m^3 units • estimating volume by using referents for cm^3 or m^3 • measuring and recording volume (cm^3 or m^3) • constructing rectangular prisms for a given volume [C, CN, ME, PS, R, V] C4 demonstrate an understanding of capacity by • describing the relationship between mL and L • selecting and justifying referents for mL or L units • estimating capacity by using referents for mL or L • measuring and recording capacity (mL or L) [C, CN, ME, PS, R, V]	C1 demonstrate an understanding of angles by • identifying examples of angles in the environment • classifying angles according to their measure • estimating the measure of angles using 45°, 90° and 180° as reference angles • determining angle measures in degrees • drawing and labelling angles when the measure is specified [C, CN, ME, V] C2 demonstrate that the sum of interior angles is: • 180° in a triangle • 360° in a quadrilateral [C, R] C3 develop and apply a formula for determining the • perimeter of polygons • area of rectangles • volume of right rectangular prisms [C, CN, PS, R, V]	C1 demonstrate an understanding of circles by • describing the relationships among radius, diameter, and circumference of circles • relating circumference to pi • determining the sum of the central angles • constructing circles with a given radius or diameter • solving problems involving the radii, diameters, and circumferences of circles [C, CN, R, V] C2 develop and apply a formula for determining the area of • triangles • parallelograms • circles [CN, PS, R, V]
3-D Objects and 2-D Shapes	C2 sort 3-D objects using a single attribute [C, CN, PS, R, V] C3 build and describe 3-D objects [CN, PS, V]	C2 sort 3-D objects and 2-D shapes using one attribute, and explain the sorting rule [C, CN, R, V] C3 replicate composite 2-D shapes and 3-D objects [CN, PS, V] C4 compare 2-D shapes to parts of 3-D objects in the environment [C, CN, V]	C6 sort 2-D shapes and 3-D objects using two attributes, and explain the sorting rule [C, CN, R, V] C7 describe, compare, and construct 3-D objects, including • cubes • spheres • cones • cylinders • pyramids [C, CN, R, V] C8 describe, compare, and construct 2-D shapes, including • triangles • squares • rectangles • circles [C, CN, R, V] C9 identify 2-D shapes as parts of 3-D objects in the environment [C, CN, R, V]	C6 describe 3-D objects according to the shape of the faces, and the number of edges and vertices [C, CN, PS, R, V] C7 sort regular and irregular polygons, including • triangles • quadrilaterals • pentagons • hexagons • octagons according to the number of sides [C, CN, R, V]	C4 describe and construct rectangular and triangular prisms [C, CN, R, V]	C5 describe and provide examples of edges and faces of 3-D objects, and sides of 2-D shapes that are • parallel • intersecting • perpendicular • vertical • horizontal [C, CN, R, T, V] C6 identify and sort quadrilaterals, including • rectangles • squares • trapezoids • parallelograms • rhombuses according to their attributes [C, R, V]	C4 construct and compare triangles, including • scalene • isosceles • equilateral • right • obtuse • acute in different orientations [C, PS, R, V] C5 describe and compare the sides and angles of regular and irregular polygons [C, PS, R, V]	C3 perform geometric constructions, including • perpendicular line segments • parallel line segments • perpendicular bisectors • angle bisectors [CN, R, V]
Transformations					C5 demonstrate an understanding of line symmetry by • identifying symmetrical 2-D shapes • creating symmetrical 2-D shapes • drawing one or more lines of symmetry in a 2-D shape [C, CN, V]	C7 perform a single transformation (translation, rotation, or reflection) of a 2-D shape (with and without technology) and draw and describe the image [C, CN, T, V] C8 identify a single transformation, including a translation, rotation and reflection of 2-D shapes [C, T, V]	C6 perform a combination of translation(s), rotation(s) and/or reflection(s) on a single 2-D shape, with and without technology, and draw and describe the image [C, CN, PS, T, V] C7 perform a combination of successive transformations of 2-D shapes to create a design, and identify and describe the transformations [C, CN, T, V] C8 identify and plot points in the first quadrant of a Cartesian plane using whole number ordered pairs [C, CN, V] C9 perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian plane (limited to whole number vertices) [C, CN, PS, T, V]	C4 identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs [C, CN, V] C5 perform and describe transformations (translations, rotations or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices) [CN, PS, T, V]
Statistics and Probability — Data Analysis			D1 gather and record data about self and others to answer questions [C, CN, PS, V] D2 construct and interpret concrete graphs and pictographs to solve problems [C, CN, PS, R, V]	D1 collect first-hand data and organize it using • tally marks • line plots • charts • lists to answer questions [C, CN, V] D2 construct, label and interpret bar graphs to solve problems [PS, R, V]	D1 demonstrate an understanding of many-to-one correspondence [C, R, T, V] D2 construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions [C, PS, R, V]	D1 differentiate between first-hand and second-hand data [C, R, T, V] D2 construct and interpret double bar graphs to draw conclusions [C, PS, R, T, V]	D1 create, label, and interpret line graphs to draw conclusions [C, CN, PS, R, V] D2 select, justify, and use appropriate methods of collecting data, including • questionnaires • experiments • databases • electronic media [C, PS, T] D3 graph collected data and analyze the graph to solve problems [C, CN, PS]	D1 demonstrate an understanding of central tendency and range by • determining the measures of central tendency (mean, median, mode) and range • determining the most appropriate measures of central tendency to report findings [C, PS, R, T] D2 determine the effect on the mean, median, and mode when an outlier is included in a data set [C, CN, PS, R] D3 construct, label, and interpret circle graphs to solve problems [C, CN, PS, R, T, V]
Chance and Uncertainty					D3 describe the likelihood of a single outcome occurring using words such as • impossible • possible • certain [C, CN, PS, R] D4 compare the likelihood of two possible outcomes occurring using words such as • less likely • equally likely • more likely [C, CN, PS, R]	D4 demonstrate an understanding of probability by • identifying all possible outcomes of a probability experiment • differentiating between experimental and theoretical probability • determining the theoretical probability of outcomes in a probability experiment • determining the experimental probability of outcomes in a probability experiment • comparing experimental results with the theoretical probability for an experiment [C, ME, PS, T]		D4 express probabilities as ratios, fractions, and percents [C, CN, R, T, V] D5 identify the sample space (where the combined sample space has 36 or fewer elements) for a probability experiment involving two independent events [C, ME, PS] D6 conduct a probability experiment to compare the theoretical probability (determined using a tree diagram, table or another graphic organizer) and experimental probability of two independent events [C, PS, R, T]

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