Appendix B

Scope and Sequence Chart for the Elementary Grades

GCOs - A1-A7

- A1 identify and model fractions and mixed numbers
- A2 interpret and model decimal tenths and hundredths
- A3 model and record numbers to 99 999
- A4 compare and order whole numbers to five digits
- A5 compare and order fractions
- A6 rename fractions with and without the use of models
- A7 compare and order decimals with and without models

GCOs - A1-A11

- A1 demonstrate an understanding of number meaning for whole numbers to millions
- A2 interpret and model decimal tenths, hundredths and thousandths
- A3 interpret, model and rename fractions
- A4 demonstrate an understanding of the relationship between fractions and division
- A5 explore the concepts of ratio and rate informally
- A6 read, write, and represent numbers to millions
- A7 read, write, and represent decimals to thousandths
- A8 compare and order numbers to millions
- A9 compare and order decimals to thousandths
- A10 compare and order fractions using conceptual methods
- A11 recognize and find factors of numbers

GCOs - A1-A11

- A1 represent, estimate, and order numbers to billions using fraction and decimal notation
- A2 represent, compare and order fractions and decimals
- A3 write and interpret ratios, comparing part-to-part and part-to-whole
- A4 demonstrate an understanding of equivalent ratios
- A5 demonstrate an understanding of the concept of percent as a ratio
- A6 demonstrate an understanding of the meaning of a negative integer
- A7 read and write whole numbers to billions using standard and expanded forms
- A8 demonstrate an understanding of the place value system
- A9 relate fractional and decimal forms of numbers
- A10 determine factors and greatest common factors of two numbers
- A11 distinguish between prime and composite numbers

GCOs - B1-B17

- B1 add and subtract decimals involving tenths and hundredths, and whole numbers to five digits
- B2 demonstrate an understanding of multiplication meanings and applications
- B3 demonstrate an understanding of the various meanings of division
- B4 multiply 2- or 3-digit numbers by single-digit numbers concretely, pictorially, and symbolically
- B5 divide 2- and 3-digit whole numbers by a single-digit divisor
- B6 use models informally to add simple fractions with common denominators
- B7 demonstrate an understanding of the use of the open frame as a place holder for a digit on some occasions and for a number on other occasions
- B8 relate multiplication and division facts, using principles of these operations
- B9 demonstrate a knowledge of multiplication facts to 9 x 9
- B10 demonstrate an understanding of various treatments of remainders in division situations
- B11 solve and create word problems involving whole number computations
- B12 solve and create word problems involving adding and subtracting decimals (to hundredths)
- B13 estimate sums and differences of whole numbers and decimals
- B14 estimate the product or quotient of 2- or 3-digit numbers and single-digit numbers
- B15 mentally solve appropriate addition and subtraction computation
- B16 mentally multiply 2-digit numbers by 10 or 100
- B17 use technology for computations involving many decimal places or large whole numbers

GCOs - B1-B15

- B1 find sums and differences involving decimals to thousandths
- B2 multiply 2-, 3- and 4- digit whole numbers by 1-digit whole numbers
- B3 find the product of two 2-digit whole numbers.
- B4 divide 2-, 3- and 4-digit whole numbers by single-digit whole divisors
- B5 find products of single-digit whole numbers and decimal numbers to hundredths
- B6 divide decimal numbers to hundredths by single-digit whole numbers
- B7 determine whether an open sentence is always, sometimes, or never true
- B8 solve and create addition and subtraction problems involving whole numbers, decimal numbers and combinations of both
- B9 solve and create multiplication and division problems involving whole numbers, decimal numbers and combinations of both
- B10 estimate sums and differences involving decimals to thousandths
- B11 estimate products and quotients of two whole numbers
- B12 estimate products and quotients of decimal numbers by single-digit whole numbers.
- B13 perform appropriate mental multiplications
- B14 divide numbers mentally when appropriate.
- B15 multiply whole numbers by 0.1, 0.01 and 0.001 mentally

GCOs - B1-B12

- B1 compute products of whole numbers and decimals to thousandths
- B2 model and calculate the products of two decimal numbers
- B3 compute quotients of whole numbers and decimals using up to 2-digit whole number divisors
- B4 model and calculate the quotients of two decimals up to 2-digit divisors
- B5 add and subtract simple fractions using models
- B6 demonstrate an understanding of the function nature of input-output situations
- B7 solve and create relevant addition, subtraction, multiplication, and division problems involving whole numbers
- B8 solve and create relevant addition, subtraction, multiplication, and division problems involving decimals
- B9 estimate products and quotients involving whole numbers only, whole numbers and decimals, and decimals only
- B10 divide numbers by 0.1, 0.01, and 0.001 mentally
- B11 calculate sums and differences in relevant contexts by using the most appropriate method
- B12 calculate products and quotients in relevant contexts by using the most appropriate method

GCOs - C1-C6

C1 demonstrate an understanding of the relationship between adding decimals and adding whole numbers
C2 apply the pattern identified when multiplying by increasing powers of ten
C3 use patterns to solve computation problems
C4 understand how a change in either a or b in a + b, a - b, a x b, or a ÷ b will affect the result of the computation
C5 represent multiplication facts either in a table or graphically
C6 complete open sentences of the forms a x b = □, a x □ = c, a ÷ b = □ and a ÷ □ = c

GCOs - C1-C9

C1 use place value patterns to extend understanding of the representation of numbers to millions.
C2 recognize and explain the pattern in dividing by 10, 100 and 1000 and in multiplying by 0.1, 0.01 and 0.001
C3 solve problems using patterns
C4 rearrange factors to make multiplication simpler
C5 recognize and explain how a change in one factor affects a product or quotient
C6 predict how a change in unit affects an SI measurement
C7 manipulate the dimensions of a rectangle so that the area remains the same
C8 demonstrate an understanding that the multiplicative relationship between numerators and denominators is constant for equivalent fractions
C9 represent measurement relationships using tables and two-dimensional graphs

GCOs - C1-C9

C1 solve problems involving patterns
C2 use patterns to explore division by 0.1, 0.01, and 0.001
C3 recognize and explain how changes in base or height affect areas of rectangles, parallelograms and triangles
C4 recognize and explain how changes in height, depth or length affect volumes of rectangular prisms
C5 recognize and explain how a change in one term of a ratio affects the other term
C6 represent equivalent ratios using tables and graphs
C7 represent square and triangular numbers concretely, pictorially and symbolically
C8 solve simple linear equations using open frames
C9 demonstrate an understanding of the use of letters to replace open frames

GCOs - D1-D11

D1	recognize and demonstrate that objects of various shapes can have the same area
D2	recognize and demonstrate that objects of the same area can have different perimeters
D3	measure volume, using non-standard units
D4	estimate and determine the volume of rectangular prisms, using centimeter cubes
D5	recognize that the measure of an angle indicates an amount of turn
D6	estimate and measure angles, using non-standard units
D7	use a thermometer to read temperatures
D8	estimate and measure in millimetres, centimetres, decimetres, metres and kilometres
D9	estimate and measure area in square centimetres
D10	solve relevant problems involving millilitres and litres, grams and kilograms
D11	relate dimensions and areas of rectangles to factors and products

GCOs - D1-D8

D1	solve simple problems involving the perimeters of polygons
D2	calculate areas of irregular shapes
D3	determine the measure of right, acute and obtuse angles
D4	demonstrate an understanding of the relationship among particular SI units
D5	develop formulas for areas and perimeters of squares and rectangles
D6	solve simple problems involving volume and capacity
D7	estimate angle size to within 10 degrees
D8	determine which unit is appropriate in a given situation and solve problems involving length and area

GCOs - D1-D9

D1	use the relationship among particular SI units to compare objects
D2	describe mass measurement in tonnes
D3	demonstrate an understanding of the relationship between capacity and volume
D4	estimate and measure angles using a protractor
D5	draw angles of a given size
D6	solve measurement problems involving length, capacity, area, volume, mass, and time
D7	demonstrate an understanding of the relationships among the bases, heights, and areas of parallelograms and use this relationship to solve problems
D8	demonstrate an understanding of the relationship between the area of a triangle and the area of a related parallelogram and use this relationship to solve problems
D9	demonstrate an understanding of the relationship between the three dimensions of rectangular prisms and volume and surface area and use these relationships to solve problems

GCOs - E1-E12

- E1 draw various nets for rectangular prisms and cubes
- E2 construct models for various cylinders, cones, prisms, and pyramids
- E3 construct shapes, given isometric drawings
- E4 explore relationships among 3-D shapes
- E5 find all possible composite figures that can be made from a given set of figures
- E6 recognize, name, describe and construct acute and obtuse angles
- E7 recognize, name, describe and construct equilateral, isosceles and scalene triangles
- E8 make generalizations about the angle, side length, and parallel side properties of the various quadrilaterals
- E9 sort quadrilaterals under property headings
- E10 make generalizations about the numbers of vertices, edges, and faces of various prisms and pyramids, cones, and cylinders
- E11 predict and confirm the results of various 2-D figures under slides, reflections, and quarter/half turns
- E12 make generalizations about the reflective symmetry property of the various quadrilaterals

GCOs - E1-E13

- E1 draw a variety of nets for various prisms and pyramids
- E2 identify, describe and represent the varios cross-sections of cubes and rectangular prisms
- E3 make and interpret isometric drawings of shapes made from cubes
- E4 explore relationships between area and perimeter of squares and rectangles
- E5 predict and construct figures made by combining two triangles
- E6 recognize, name, describe and represent perpendicular lines/segments, bisectors of angles and segments, and perpendicular-bisectors of segments
- E7 recognize, name, describe and construct right, obtuse and acute triangles
- E8 make generalizations about diagonal properties of squares and rectangles and apply them
- E9 make generalizations about the properties of translations and reflections and apply them
- E10 explore rotations of one-quarter, one-half and three-quarter turns, using a variety of centers
- E11 make generalizations about the rotational symmetry properties of squares and rectangles and apply them
- E12 recognize, name and represent figures that tessellate
- E13 explore how figures can be dissected and transformed into other figures

GCOs - E1-E10

- E1 describe and represent the various cross-sections of cones, cylinders, pyramids, and prisms
- E2 make and interpret orthographic drawings of 3-D shapes made with cubes
- E3 make and apply generalizations about the sum of the angles in triangles and quadrilaterals
- E4 make and apply generalizations about the diagonal properties of trapezoids, kites, parallelogram, and rhombi
- E5 sort the members of the quadrilateral "family" under property headings
- E6 recognize, name, describe, and represent similar figures
- E7 make generalizations about the planes of symmetry of 3-D shapes
- E8 make generalizations about the rotational symmetry property of all members of the quadrilateral "family" and of regular polygons
- E9 recognize and represent dilatation images of 2-D figures and connect to similar figures
- E10 predict and represent the result of combining transformations

GCOs - F1-F8

F1 recognize and use a variety of methods for the collection and organization of data
F2 describe data maxima, minima, range and frequency
F3 read and interpret bar graphs, line graphs, pictographs and stem-and-leaf plots
F4 display position, using ordered pairs on a grid
F5 construct bar graphs, pictographs and steam-and-leaf plots
F6 interpolate data from a display
F7 describe data, using the mean
F8 explore real-world issues of interest to students and for wich data collection is necessary to determine an answer

GCOs - F1-F7

F1 use double bar graphs to display data
F2 use bar graphs to display and interpret data
F3 use coordinate graphs to display data.
F4 create and interpret line graphs
F5 group data appropriately and use stem-and-leaf plots to describe the data
F6 recognize and explain the effect of changes in data on the mean of that data
F7 explore relevant issues for which data collection assists in reaching conclusions.

GCOs F1-F9

F1 choose and evaluate appropriate samples for data collections
F2 identify various types of data sources
F3 plot coordinates in four quadrants
F4 use bar graphs, double bar graphs, and stem-and-leaf plots to display data
F5 use circle graphs to represent proportions
F6 interpret data represented in scatterplots
F7 make inferences from data displays including bar graphs, double bar graphs and stem-and-leaf plots
F8 demonstrate an understanding of the difference between mean, median, and mode
F9 explore relevant issues for which data collection assists in reaching conclusions

GCOs - G1-G4

G1 predict probabilities as either close to 0, near 1, or near ½
G2 cite examples of everyday events with very high or very low probabilities
G3 predict whether one simple outcome is more or less likely than another
G4 use fractions to describe experimental probabilities

GCOs - G1-G2

G1 conduct simple experiments to determine probabilities
G2 determine simple theoretical probabilities and use fractions to describe them

GCOs - G1-G5

G1 conduct simple simulations to determine probabilities
G2 evaluate the reliability of sampling results
G3 analyze simple probabilistic claims
G4 determine theoretical probabilities
G5 identify events that might be associated with a particular theoretical probability