



Learning

Outcomes

Framework

April 2004

Mathematics

Grades Primary–6

Learning Outcomes Framework
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Grade Primary

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number theory concepts.

By the end of grade 3, students will be expected to

- construct and communicate number meanings, and explore and apply estimation strategies, with respect to whole numbers
- concretely explore common fractions and decimals in meaningful situations
- read and write whole numbers and demonstrate an understanding of place value (to four places)
- order whole numbers and represent them in multiple ways
- apply number theory concepts (e.g., place value pattern) in meaningful contexts with respect to whole numbers and commonly used fractions and decimals

Students will be expected to

- A1 sort sets on the basis of number
- A2 count to determine the number in a group
- A3 create sets of a given number
- A4 explore a variety of physical representations of numbers
- A5 count in a variety of ways
- A6 interpret ordinal numbers
- A7 recognize the meaning of halves when used in context
- A8 use symbols to represent numbers
- A9 determine which group has more, which has less/fewer, or whether groups are equivalent

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 3, students will be expected to

- demonstrate an understanding of the connection between relevant, concrete experiences and the mathematical language and symbolism of the four basic operations
- recognize and explain the relationships among the four basic operations
- create and model problem situations involving whole numbers, using one or more of the four basic operations
- demonstrate proficiency with addition and subtraction facts
- apply computational facts and strategies with respect to the four basic operations and model addition and subtraction in situations involving whole numbers

Students will be expected to

- B1 count the results when small groups are combined
- B2 count the results when small groups are separated
- B3 determine how many more one group has than another

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

- apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers
- select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations

GCO C: Students will explore, recognize, represent, and apply patterns and relationships, both informally and formally.

By the end of grade 3, students will be expected to

- recognize, describe, extend, and create patterns and sequences in a variety of mathematical and real-world contexts (e.g., geometric, numeric, and measurement)

Students will be expected to

- C1 copy and extend patterns including those involving number, shape, size, and colour
- C2 copy patterns based on measurement attributes
- C3 create patterns
- C4 represent the same pattern in multiple ways

- use patterns to solve problems
- represent mathematical patterns and relationships in informal ways, including via open sentences (e.g., statements with missing addends)

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

By the end of grade 3, students will be expected to

- measure and understand basic concepts and attributes of length, capacity, mass, area, and time

Students will be expected to

- D1 compare and order objects based on length, capacity, and mass
- D2 sequence events
- D3 sort items based on measurement attributes

- identify and use non-standard and standard units of measurement and appreciate their role in communications
- estimate and determine measurements in every-day problem situations and develop a sense of the relative size of units

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

By the end of grade 3, students will be expected to

- explore and experiment with geometric shapes and relationships (including the orientation and perspectives of objects)
- describe, model, draw, and classify 2- and 3-D figures and shapes
- investigate and predict the results of combining, subdividing, and transforming shapes
- relate geometric ideas to number and measurement ideas and recognize and apply geometric principles in real-world situations

Students will be expected to

- E1 develop spatial sense, including position-in-space and the language associated with it
- E2 develop spatial sense, including eye-motor co-ordination
- E3 sort and build with 2-D and 3-D shapes
- E4 pattern with 2-D and 3-D shapes
- E5 recognize, name, describe, and compare 3-D shapes (including sphere, cylinder, cone, and cube) and 2-D shapes (including square, triangle, circle, and rectangle)
- E6 build 2-D shapes using structured materials
- E7 subdivide and change shapes
- E8 make transformations of figures and shapes
- E9 recognize familiar shapes occurring in the environment

GCO F: Students will solve problems involving the collection, display, and analysis of data.

By the end of grade 3, students will be expected to

- collect, record, organize, and describe relevant data
- construct concrete and pictorial displays of relevant data
- read and interpret displays of relevant data
- generate questions, develop and modify predictions and implement plans with respect to data analysis

Students will be expected to

- F1 collect and organize data about issues of personal interest
- F2 form and interpret “people” graphs
- F3 interpret and create real and picture graphs

GCO G: Students will represent and solve problems involving uncertainty.

By the end of grade 3, students will be expected to

- conduct informal investigations of chance and estimate probabilities with respect to games and other simple, everyday situations

Grade 1

Key-Stage Curriculum Outcomes

Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number theory concepts.

By the end of grade 3, students will be expected to

- construct and communicate number meanings, and explore and apply estimation strategies, with respect to whole numbers
- concretely explore common fractions and decimals in meaningful situations
- read and write whole numbers and demonstrate an understanding of place value (to four places)
- order whole numbers and represent them in multiple ways
- apply number theory concepts (e.g., place value pattern) in meaningful contexts with respect to whole numbers and commonly used fractions and decimals

Students will be expected to

- A1 compare two sets for size in a variety of ways
- A2 create equivalent sets and sets that differ by small amounts
- A3 count in a variety of ways
- A4 sort sets based on number
- A5 match quantities with numerals
- A6 count beyond 10 in a variety of ways
- A7 estimate amounts between 10 and 100
- A8 demonstrate an understanding of simple fractional parts
- A9 order numbers and use ordinal language
- A10 explore the meaning of the numbers between 10 and 20
- A11 model numbers grouped in tens and ones
- A12 compare 2-digit numbers

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 3, students will be expected to

- demonstrate an understanding of the connection between relevant, concrete experiences and the mathematical language and symbolism of the four basic operations
- recognize and explain the relationships among the four basic operations
- create and model problem situations involving whole numbers, using one or more of the four basic operations

Students will be expected to

- B1 recognize that addition is used to represent the joining of two groups
- B2 recognize that subtraction is used to represent separating situations
- B3 recognize the relationship between addition and subtraction
- B4 recognize that subtraction can be used to solve missing addend problems
- B5 recognize how to use addition or subtraction to solve comparison problems
- B6 move freely among representing an addition or subtraction situation with a picture, a model, or a number sentence

Key-Stage Curriculum Outcomes**Specific Curriculum Outcomes**

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

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| <ul style="list-style-type: none"> • demonstrate proficiency with addition and subtraction facts • apply computational facts and strategies with respect to the four basic operations and model addition and subtraction in situations involving whole numbers • apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers • select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations | <p>B7 use mental strategies to find sums to 18 and differences from 18 or less</p> <p>B8 know simple addition facts from among those for which the total is 10 or less and know the corresponding subtraction facts</p> |
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GCO C: Students will explore, recognize, represent, and apply patterns and relationships, both informally and formally.

By the end of grade 3, students will be expected to

- recognize, describe, extend, and create patterns and sequences in a variety of mathematical and real-world contexts (e.g., geometric, numeric, and measurement)
- use patterns to solve problems
- represent mathematical patterns and relationships in informal ways, including via open sentences (e.g., statements with missing addends)

Students will be expected to

- C1 create and recognize physical configurations for numbers
- C2 reproduce, extend, and create simple patterns based on number
- C3 sequence events
- C4 create patterns with 3-D solids and 2-D shapes
- C5 use number patterns to help solve addition and subtraction questions

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

By the end of grade 3, students will be expected to

- measure and understand basic concepts and attributes of length, capacity, mass, area, and time

Students will be expected to

- D1 identify procedures (not involving units) to compare and/or order lengths, capacities, and areas
- D2 identify procedures (not involving units) to compare and/or order masses and durations of time

Key-Stage Curriculum Outcomes	Specific Curriculum Outcomes
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GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement. *(continued)*

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| <ul style="list-style-type: none"> • identify and use non-standard and standard units of measurement and appreciate their role in communications • estimate and determine measurements in every-day problem situations and develop a sense of the relative size of units | <p>D3 identify and use non-standard units to estimate and measure length, capacity, time, mass, and area</p> <p>D4 read hours on an analog clock</p> |
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GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

By the end of grade 3, students will be expected to

- explore and experiment with geometric shapes and relationships (including the orientation and perspectives of objects)
- describe, model, draw, and classify 2- and 3-D figures and shapes
- investigate and predict the results of combining, subdividing, and transforming shapes
- relate geometric ideas to number and measurement ideas and recognize and apply geometric principles in real-world situations

Students will be expected to

- E1 develop aspects of spatial sense, including visual memory
- E2 develop aspects of spatial sense, including figure ground perception
- E3 sort, build, and pattern with 2-D and 3-D shapes
- E4 recognize and represent angles
- E6 describe attributes of and sort and compare 2-D and 3-D shapes
- E5 recognize, name, describe, and represent a variety of 2-D and 3-D shapes
- E7 recognize 2-D figures in 3-D shapes
- E8 build, divide, and change 2-D shapes
- E9 recognize, name, describe, and represent slides and reflections of 2-D shapes
- E10 recognize and identify 2-D and 3-D shapes in the environment
- E11 cover figures and fill shapes with countable non-standard units
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GCO F: Students will solve problems involving the collection, display, and analysis of data.

By the end of grade 3, students will be expected to

- collect, record, organize, and describe relevant data
- construct concrete and pictorial displays of relevant data
- read and interpret displays of relevant data
- generate questions, develop and modify predictions and implement plans with respect to data analysis

Students will be expected to

- F1 collect and organize data
- F2 interpret and create concrete and picture graphs
- F3 interpret and create pictographs and symbolic graphs
- F4 pose oral questions in relation to conducting surveys and/or interpreting data
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Key-Stage Curriculum Outcomes

Specific Curriculum Outcomes

GCO G: Students will represent and solve problems involving uncertainty.

By the end of grade 3, students will be expected to

- conduct informal investigations of chance and estimate probabilities with respect to games and other simple, everyday situations

Students will be expected to

- G1 predict whether an event can never occur, must always occur, or simply might occur sometimes

Grade 2

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number theory concepts.

By the end of grade 3, students will be expected to

- construct and communicate number meanings, and explore and apply estimation strategies, with respect to whole numbers
- concretely explore common fractions and decimals in meaningful situations
- read and write whole numbers and demonstrate an understanding of place value (to four places)
- order whole numbers and represent them in multiple ways
- apply number theory concepts (e.g., place value pattern) in meaningful contexts with respect to whole numbers and commonly used fractions and decimals

Students will be expected to

- A1 order numbers and use ordinal language
- A2 count in a variety of ways
- A3 estimate the size of numbers to the nearest multiple of 10
- A4 identify simple fractions using models
- A5 describe numbers in a variety of ways
- A6 demonstrate an understanding of base-10 groupings
- A7 model numbers to three places
- A8 compare and order numbers by size
- A9 recognize, extend, and create simple place-value patterns

GCO B: Students will demonstrate number sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 3, students will be expected to

- demonstrate an understanding of the connection between relevant, concrete experiences and the mathematical language and symbolism of the four basic operations
- recognize and explain the relationships among the four basic operations
- create and model problem situations involving whole numbers, using one or more of the four basic operations
- demonstrate proficiency with addition and subtraction facts

Students will be expected to

- B1 recognize that multiplication can be used to determine the total amount in groups of equal size
- B2 recognize that division can mean determining how many groups of a fixed size are in a larger group or fair sharing
- B3 demonstrate an understanding that addition can be used to solve subtraction problems and vice versa
- B4 create word problems involving addition and subtraction
- B5 develop and apply strategies to learn addition and subtraction facts
- B6 recall addition facts involving two addends, each less than 10, and the related subtraction facts

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO B: Students will demonstrate number sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

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| <ul style="list-style-type: none"> • apply computational facts and strategies with respect to the four basic operations and model addition and subtraction in situations involving whole numbers | B7 demonstrate an understanding of basic principles of addition
B8 add 3 single-digit numbers
B9 model and perform the addition of two 2-digit numbers, with and without regrouping
B10 model and perform the subtraction of two 2-digit numbers, with and without regrouping |
| <ul style="list-style-type: none"> • apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers | B11 estimate the sum or difference of two 2-digit numbers |
| <ul style="list-style-type: none"> • select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations | B12 use technology to solve problems involving sums or differences of larger numbers |
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GCO C: Students will explore, recognize, represent and apply patterns and relationships, both informally and formally.

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| <p><i>By the end of grade 3, students will be expected to</i></p> <ul style="list-style-type: none"> • recognize, describe, extend, and create patterns and sequences in a variety of mathematical and real-world contexts (e.g., geometric, numeric, and measurement) • use patterns to solve problems • represent mathematical patterns and relationships in informal ways, including via open sentences (e.g., statements with missing addends) | <p><i>Students will be expected to</i></p> C1 compare and contrast patterns
C2 demonstrate an understanding that there are often many ways to continue a pattern, unless a pattern rule is provided
C3 identify and use patterns in an addition table
C4 identify and extend place-value patterns
C5 represent patterns using their own notation or symbolism
C6 solve simple open sentences involving addition and subtraction facts |
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GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

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| <p><i>By the end of grade 3, students will be expected to</i></p> <ul style="list-style-type: none"> • measure and understand basic concepts and attributes of length, capacity, mass, area, and time | <p><i>Students will be expected to</i></p> D1 identify procedures not involving units to be used to compare areas |
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Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement. *(continued)*

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| <ul style="list-style-type: none"> • identify and use non-standard and standard units of measurement and appreciate their role in communications | D2 demonstrate a sense of how long 1 cm and 1 m are
D3 estimate and measure length in non-standard and standard units
D4 recognize and explain why standard units are used
D5 demonstrate a sense of how much 1 L is
D6 estimate and measure capacity in non-standard and standard units
D7 demonstrate a sense of how much 1 kg is
D8 estimate and measure mass using non-standard and standard units
D9 estimate and measure time using non-standard units
D10 read hours and half-hours on a clock
D11 explore properties of the calendar |
| <ul style="list-style-type: none"> • estimate and determine measurements in every-day problem situations and develop a sense of the relative size of units | D12 choose appropriate units with which to estimate and measure, and perform the measurements
D13 demonstrate an understanding that the size of the unit used affects the number describing the measurement
D14 demonstrate an understanding that 100 cm makes up 1 m |
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GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

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| <p><i>By the end of grade 3, students will be expected to</i></p> <ul style="list-style-type: none"> • explore and experiment with geometric shapes and relationships (including the orientation and perspectives of objects) | <p><i>Students will be expected to</i></p> E1 develop aspects of spatial sense, including perceptual constancy, perception of spatial relationships, and visual discrimination
E2 recognize 3-D shapes from drawings and from alternative perspectives
E3 sort, build, and pattern with 2-D and 3-D shapes
E4 recognize, name, and represent parallel lines and right angles |
| <ul style="list-style-type: none"> • describe, model, draw, and classify 2- and 3-D figures and shapes | E5 recognize, name, describe, and represent parallelograms
E6 recognize, name, describe, and represent triangular, square, and rectangular prisms and pyramids
E7 cut and assemble nets of cubes and triangular, square, and rectangular prisms and pyramids
E8 recognize surfaces and faces of 3-D shapes |

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships. *(continued)*

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| <ul style="list-style-type: none"> • relate geometric ideas to number and measurement ideas and recognize and apply geometric principles in real-world situations | <p>E12 recognize and identify reflective symmetry in the environment</p> <p>E13 make the connection between reflective symmetry and one-half using squares, rectangles, and circles</p> <p>E14 make the connection between even/odd numbers and rectangles</p> |
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GCO F: Students will solve problems involving the collection, display, and analysis of data.

By the end of grade 3, students will be expected to

- collect, record, organize, and describe relevant data
 - construct concrete and pictorial displays of relevant data
 - read and interpret displays of relevant data
 - generate questions, develop and modify predictions and implement plans with respect to data analysis
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Students will be expected to

- F1 conduct simple surveys and record data
- F2 create and interpret pictographs and symbolic bar graphs
- F3 develop and modify predictions with respect to data collected or presented to them
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GCO G: Students will represent and solve problems involving uncertainty.

By the end of grade 3, students will be expected to

- conduct informal investigations of chance and estimate probabilities with respect to games and other simple, everyday situations

Students will be expected to

- G1 demonstrate an understanding that some events are more likely than others
- G2 demonstrate an understanding that probability predictions need not always come true
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Grade 3

General Curriculum Outcomes

Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number theory concepts.

By the end of grade 3, students will be expected to

- construct and communicate number meanings, and explore and apply estimation strategies, with respect to whole numbers
- concretely explore common fractions and decimals in meaningful situations
- read and write whole numbers and demonstrate an understanding of place value (to four places)
- order whole numbers and represent them in multiple ways
- apply number theory concepts (e.g., place value pattern) in meaningful contexts with respect to whole numbers and commonly used fractions and decimals

Students will be expected to

- A1 compare and order whole numbers to thousands
- A2 estimate the size of numbers to the nearest ten or hundred
- A3 use simple fractions to describe situations
- A4 demonstrate an understanding of base-10 groupings (units, tens, hundreds, thousands)
- A5 record, model, and interpret numbers up to and including the thousands
- A6 read numbers in several ways
- A7 extend the place-value system to model and record numbers involving tenths
- A8 order and compare decimals to tenths

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 3, students will be expected to

- demonstrate an understanding of the connection between relevant, concrete experiences and the mathematical language and symbolism of the four basic operations
- recognize and explain the relationships among the four basic operations
- create and model problem situations involving whole numbers, using one or more of the four basic operations
- demonstrate proficiency with addition and subtraction facts

Students will be expected to

- B1 recognize several meanings for multiplication
- B2 recognize several meanings for division
- B3 recognize the relationship between multiplication and division
- B4 solve and create problems involving addition and/or subtraction
- B5 solve and create problems involving multiplication and division with small numbers

General Curriculum Outcomes**Specific Curriculum Outcomes**

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

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| <ul style="list-style-type: none"> • apply computational facts and strategies with respect to the four basic operations and model addition and subtraction in situations involving whole numbers | B6 | add and subtract with and without regrouping (up to and including three-digit numbers) |
| | B7 | recognize principles of multiplication and division |
| | B8 | relate multiplication and division facts |
| <ul style="list-style-type: none"> • apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers | B9 | continue to estimate in addition and subtraction situations |
| | B10 | begin to estimate in multiplication and division situations |
| <ul style="list-style-type: none"> • select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations | B11 | mentally add and subtract two-digit and one-digit numbers |
| | B12 | mentally add and subtract rounded numbers |
| | B13 | use technology to solve problems involving larger numbers |

GCO C: Students will explore, recognize, represent, and apply patterns and relationships, both informally and formally.

By the end of grade 3, students will be expected to

- recognize, describe, extend, and create patterns and sequences in a variety of mathematical and real-world contexts (e.g., geometric, numeric, and measurement)
- use patterns to solve problems
- represent mathematical patterns and relationships in informal ways, including via open sentences (e.g., statements with missing addends)

Students will be expected to

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| C1 | recognize the pattern implicit in the place-value system |
| C2 | recognize and create geometric patterns |
| C3 | use and recognize the patterns in a multiplication table |
| C4 | record a repeated addition pattern using multiplicative notation |
| C5 | recognize the meaning of open sentences of the forms: |
| | $a \times b = \square$ |
| | $a \times \square = c$ |
| | $\square \times b = c$ |

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

By the end of grade 3, students will be expected to

- measure and understand basic concepts and attributes of length, capacity, mass, area, and time

Students will be expected to

General Curriculum Outcomes**Specific Curriculum Outcomes**

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement. *(continued)*

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|---|---|
| <ul style="list-style-type: none"> • identify and use non-standard and standard units of measurement and appreciate their role in communications | D1 estimate and measure length in metres, decimetres, and centimetres
D2 estimate and measure capacity in millilitres and litres
D3 estimate and measure mass in grams and kilograms
D4 estimate and measure area in non-standard units and square centimetres |
| <ul style="list-style-type: none"> • estimate and determine measurements in every-day problem situations and develop a sense of the relative size of units | D5 solve problems involving kilometres
D6 use appropriate units for capacity and mass
D7 read digital and analog clocks to the nearest five minutes
D8 continue to solve a wide variety of measurement problems |

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

By the end of grade 3, students will be expected to

- explore and experiment with geometric shapes and relationships (including the orientation and perspectives of objects)
- describe, model, draw, and classify 2- and 3-D figures and shapes
- investigate and predict the results of combining, subdividing, and transforming shapes
- relate geometric ideas to number and measurement ideas and recognize and apply geometric principles in real-world situations

Students will be expected to

- E1 continue their development of spatial sense with emphasis on perceptual constancy
- E2 recognize and represent angles that are less than/more than right angles
- E3 recognize, name, describe, and represent congruent angles and congruent polygons
- E4 recognize, name, describe, and represent kite, and some concave, convex, and regular polygons
- E5 recognize, name, describe, and represent different prisms and pyramids
- E6 cut and assemble net patterns for pentagonal and hexagonal prisms and pyramids
- E7 build skeletons of various prisms and pyramids to focus on edges and vertices
- E8 predict the results of combining triangles and/or quadrilaterals
- E9 find the lines of reflective symmetry of polygons
- E10 recognize, name, describe, and represent half and quarter turns of 2-D figures
- E11 recognize and identify various polygons, prisms, and pyramids in real-world contexts
- E12 make the connection for rectangles between the arrays of squares forming them and the describing of their dimensions

General Curriculum Outcomes**Specific Curriculum Outcomes**

GCO F: Students will solve problems involving the collection, display, and analysis of data.

By the end of grade 3, students will be expected to

- collect, record, organize, and describe relevant data
 - construct concrete and pictorial displays of relevant data
 - read and interpret displays of relevant data

 - generate questions, develop and modify predictions and implement plans with respect to data analysis
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Students will be expected to

- F1 select appropriate strategies for collecting, recording, organizing, and describing relevant data
 - F2 interpret and create pictographs in which each symbol represents more than one item
 - F3 create bar graphs using simple scales

 - F4 implement plans with respect to the collection of data
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GCO G: Students will represent and solve problems involving uncertainty.

By the end of grade 3, students will be expected to

- conduct informal investigations of chance and estimate probabilities with respect to games and other simple, everyday situations

Students will be expected to

- G1 predict and record results in experiments using spinners, coins, dice, coloured cubes, and other simple equipment

Grade 4

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number-theory concepts.

By the end of grade 6, students will be expected to

- demonstrate an understanding of number meanings with respect to whole numbers, fractions, and decimals
- explore integers, ratios, and percents in common meaningful situations
- read and write whole numbers and decimals and demonstrate an understanding of place value (to millions and to thousandths)
- order whole numbers, fractions, and decimals and represent them in multiple ways
- apply number theory concepts (e.g., prime numbers, factors) in relevant situations with respect to whole numbers, fractions, and decimals

Students will be expected to

- 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
- A5 compare and order fractions
- A6 rename fractions with and without the use of models
- A7 compare and order decimals with and without models

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 6, students will be expected to

- model problem situations involving whole numbers and decimals by selecting appropriate operations and procedures
- model problem situations involving the addition and subtraction of simple fractions

Students will be expected to

- 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- and 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

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

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| <ul style="list-style-type: none"> • explore algebraic situations informally • apply computational facts and procedures (algorithms) in a wide variety of problem situations involving whole numbers and decimals | B7 | demonstrate an understanding of 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 9×9 | |
| | 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) | |
| | <ul style="list-style-type: none"> • apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers and decimals | 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 |
| | <ul style="list-style-type: none"> • select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations | B15 | mentally solve appropriate addition and subtraction computations |
| | | B16 | mentally multiply 2-digit numbers by 10 or 100 |
| | | B17 | use technology for computations involving many decimal places or large whole numbers |

GCO C: Students will explore, recognize, represent, and apply patterns and relationships, both informally and formally.

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| <i>By the end of grade 6, students will be expected to</i> | <i>Students will be expected to</i> | |
| <ul style="list-style-type: none"> • describe, extend, and create a wide variety of patterns and relationships to model and solve problems involving real-world situations and mathematical concepts | 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 |
| <ul style="list-style-type: none"> • explore how a change in one quality in a relationship affects another • represent mathematical patterns and relationships in a variety of ways (including rules, tables, and one- and two-dimensional graphs) | C4 | understand how a change in either a or b in $a + b$, $a - b$, $a \times b$, or $a \div b$ will affect the result of the computation |
| | C5 | represent multiplication facts either in a table or graphically |
| | C6 | complete open sentences of the form $a \times b = \square$, $a \times \square = c$, $a \div b = \square$, and $a \div \square = c$ |
| <ul style="list-style-type: none"> • solve linear equations using informal, non-algebraic methods | | |

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

By the end of grade 6, students will be expected to

- extend understanding of measurement concepts and attributes to include volume, temperature, perimeter, and angle
- communicate using standard units, understand the relationship among commonly used SI units (e.g., mm, cm, m, km) and select appropriate units in given situations
- estimate and apply measurement concepts and skills in relevant problem situations and select and use appropriate tools and units
- develop and apply rules and procedures for determining measures (using concrete and graphing models)

Students will be expected to

- 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 centimetre 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

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

By the end of grade 6, students will be expected to

- identify, draw, and build physical models of geometric figures
- solve problems using geometric relationships and spatial reasoning

Students will be expected to

- 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

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships. *(continued)*

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| <ul style="list-style-type: none"> • describe, model, and compare 2- and 3-D figures and shapes, explore their properties, and classify them in alternate ways
 • investigate and predict the results of transformations and begin to use them to compare shapes and explain geometric concepts (e.g., symmetry and similarity) | 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 number of vertices, edges, and faces of various prisms, 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 |

GCO F: Students will solve problems involving the collection, display, and analysis of data.

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| <i>By the end of grade 6, students will be expected to</i> | <i>Students will be expected to</i> | |
| <ul style="list-style-type: none"> • collect, organize, describe relevant data in multiple ways
 • construct a variety of data displays (including tables, charts, and graphs) and consider their relative appropriateness
 • read, interpret, and make and modify predictions from displays of relevant data
 • develop and apply measures of central tendency (mean, median, and mode)
 • formulate and solve simple problems (both real-world and from other academic disciplines) that involve the collection, display, and analysis of data and explain conclusions which may be drawn | F1 | recognize and use a variety of methods for the collection and organization of data |
| | F2 | describe data maxima, minima, range, and frequency |
| | F4 | display position, using ordered pairs on a grid |
| | F5 | construct bar graphs, pictographs, and stem-and-leaf plots |
| | F3 | read and interpret bar graphs, line graphs, pictographs, and stem-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 which data collection is necessary to determine an answer |

Key-Stage Curriculum Outcomes	Specific Curriculum Outcomes
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GCO G: Students will represent and solve problems involving uncertainty.

By the end of grade 6, students will be expected to

- explore, interpret, and make conjectures about everyday probability situations by estimating probabilities, conducting experiments, beginning to construct and conduct simulations, and analysing claims which they see and hear

- determine theoretical probabilities using simple counting techniques
- demonstrate an understanding of the relationship between the numerical expression describing a probability and the events which give rise to the numbers

Students will be expected to

- G1 predict probabilities as either close to 0, near 1, or near $\frac{1}{2}$
- 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

Grade 5

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number theory concepts.

By the end of grade 6, students will be expected to

- demonstrate an understanding of number meanings with respect to whole numbers, fractions, and decimals
- explore integers, ratios, and percents in common meaningful situations
- read and write whole numbers and decimals and demonstrate an understanding of place value (to millions and to thousandths)
- order whole numbers, fractions, and decimals and represent them in multiple ways
- apply number theory concepts (e.g., prime numbers, factors) in relevant situations with respect to whole numbers, fractions, and decimals

Students will be expected to

- A1 represent whole numbers to the 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 and represent numbers to millions
- A7 read and represent decimals to thousandths
- A8 compare and order large numbers
- A9 compare and order decimals
- A10 compare and order fractions using conceptual methods
- A11 recognize and find factors of numbers

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 6, students will be expected to

- model problem situations involving whole numbers and decimals by selecting appropriate operations and procedures
- model problem situations involving the addition and subtraction of simple fractions

Students will be expected to

- B1 find sums and differences involving decimals to thousandths
- B2 multiply 2-, 3-, and 4-digit numbers by 1-digit numbers
- B3 find the product of two 2-digit numbers
- B4 divide 2-, 3-, and 4-digit numbers by single-digit divisors and investigate division by 2-digit divisors
- B5 find simple products of whole numbers and decimals
- B6 divide decimal numbers by single-digit whole numbers

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

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| <ul style="list-style-type: none"> • explore algebraic situations informally | B7 | determine whether an open sentence is always, sometimes, or never true |
| <ul style="list-style-type: none"> • apply computational facts and procedures (algorithms) in a wide variety of problem situations involving whole numbers and decimals | B8 | solve and create addition and subtraction problems involving whole number and/or decimals |
| | B9 | solve and create multiplication and division problems involving whole numbers and/or decimals |
| <ul style="list-style-type: none"> • apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers and decimals | B10 | estimate sums and differences involving decimals to thousandths |
| | B11 | estimate products and quotients of two whole numbers |
| | B12 | estimate products and quotients of decimals by single-digit whole numbers |
| <ul style="list-style-type: none"> • select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations | B13 | perform appropriate mental multiplications with facility |
| | B14 | divide numbers mentally when appropriate |
| | B15 | multiply whole numbers mentally by 0.1, 0.01, 0.001 |
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GCO C: Students will explore, recognize, represent, and apply patterns and relationships, both informally and formally.

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| <i>By the end of grade 6, students will be expected to</i> | <i>Students will be expected to</i> |
| <ul style="list-style-type: none"> • describe, extend, and create a wide variety of patterns and relationships to model and solve problems involving real-world situations and mathematical concepts | <ul style="list-style-type: none"> C1 use place value patterns to extend understanding of the representation of numbers to millions C2 recognize and explain the patterns in dividing by 10, 100, and 1000 and/or in multiplying by 0.1, 0.01, 0.001 C3 solve problems using patterns |
| <ul style="list-style-type: none"> • explore how a change in one quality in a relationship affects another | <ul style="list-style-type: none"> C4 rearrange factors to make multiplication simpler C5 recognize 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 |
| <ul style="list-style-type: none"> • represent mathematical patterns and relationships in a variety of ways (including rules, tables, and one- and two-dimensional graphs) | <ul style="list-style-type: none"> 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 |
| <ul style="list-style-type: none"> • solve linear equations using informal, non-algebraic methods | |

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

By the end of grade 6, students will be expected to

- extend understanding of measurement concepts and attributes to include volume, temperature, perimeter, and angle

- communicate using standard units, understand the relationship among commonly used SI units (e.g., mm, cm, m, km) and select appropriate units in given situations

- estimate and apply measurement concepts and skills in relevant problem situations and select and use appropriate tools and units

- develop and apply rules and procedures for determining measures (using concrete and graphing models)

Students will be expected to

- D1 solve simple problems involving the perimeters of polygons
- D2 calculate areas of irregular shapes
- D3 determine the measures of right angles, acute angles and obtuse angles

- D4 demonstrate an understanding of the relationships among particular SI units

- D6 solve simple problems involving volume and capacity
- D7 estimate angle size in degrees
- D8 determine which unit is appropriate in a given situation and solve problems involving length and area

- D5 develop formulas for areas and perimeters of squares and other rectangles

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

By the end of grade 6, students will be expected to

- identify, draw, and build physical models of geometric figures
- solve problems using geometric relationships and spatial reasoning

- describe, model, and compare 2- and 3-D figures and shapes, explore their properties, and classify them in alternate ways

Students will be expected to

- E1 draw a variety of nets for different prisms and pyramids
- E2 identify, describe, and represent the various 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 the diagonal properties of squares and rectangles and apply these properties

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships. *(continued)*

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| <ul style="list-style-type: none"> investigate and predict the results of transformations and begin to use them to compare shapes and explain geometric concepts (e.g., symmetry and similarity) | <p>E9 make generalizations about the properties of translations and reflections and apply these properties</p> <p>E10 explore rotations of one-quarter, one-half, and three-quarter turns using a variety of centres</p> <p>E11 make generalizations about the rotational symmetry property of squares and rectangles and apply them</p> <p>E12 recognize, name, and represent figures that tessellate</p> <p>E13 explore how figures can be dissected and transformed into other figures</p> |
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GCO F: Students will solve problems involving the collection, display, and analysis of data.

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| <p><i>By the end of grade 6, students will be expected to</i></p> <ul style="list-style-type: none"> collect, organize, describe relevant data in multiple ways construct a variety of data displays (including tables, charts, and graphs) and consider their relative appropriateness read, interpret, and make and modify predictions from displays of relevant data develop and apply measures of central tendency (mean, median, and mode) formulate and solve simple problems (both real-world and from other academic disciplines) that involve the collection, display, and analysis of data and explain conclusions which may be drawn | <p><i>Students will be expected to</i></p> <p>F1 use double bar graphs to display data</p> <p>F2 use pictographs and bar graphs to display and interpret data</p> <p>F3 use coordinate graphs to display data</p> <p>F4 create and interpret line graphs</p> <p>F5 group data appropriately and use stem-and-leaf plots to describe the data</p> <p>F6 recognize and explain the effect of certain changes in data on the mean of that data</p> <p>F7 explore relevant issues for which data collection assists in reaching conclusions</p> |
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GCO G: Students will represent and solve problems involving uncertainty.

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| <p><i>By the end of grade 6, students will be expected to</i></p> <ul style="list-style-type: none"> explore, interpret, and make conjectures about everyday probability situations by estimating probabilities, conducting experiments, beginning to construct and conduct simulations, and analysing claims which they see and hear determine theoretical probabilities using simple counting techniques demonstrate an understanding of the relationship between the numerical expression describing a probability and the events which give rise to the numbers | <p><i>Students will be expected to</i></p> <p>G1 conduct simple experiments to determine experimental probabilities</p> <p>G2 determine simple theoretical probabilities, and use fractions to describe them</p> |
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Grade 6

Key-Stage Curriculum Outcomes

Specific Curriculum Outcomes

GCO A: Students will demonstrate number sense and apply number theory concepts.

By the end of grade 6, students will be expected to

- demonstrate an understanding of number meanings with respect to whole numbers, fractions, and decimals
- explore integers, ratios, and percents in common meaningful situations
- read and write whole numbers and decimals and demonstrate an understanding of place value (to millions and to thousandths)
- order whole numbers, fractions, and decimals and represent them in multiple ways
- apply number theory concepts (e.g., prime numbers, factors) in relevant situations with respect to whole numbers, fractions, and decimals

Students will be expected to

- A1 represent large numbers in a variety of forms
- A2 represent 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 in a variety of forms
- A8 demonstrate an understanding of the place-value system
- A9 relate fractional and decimal forms of numbers
- A10 determine factors and common factors
- A11 distinguish between prime and composite numbers

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

By the end of grade 6, students will be expected to

- model problem situations involving whole numbers and decimals by selecting appropriate operations and procedures
- model problem situations involving the addition and subtraction of simple fractions
- explore algebraic situations informally

Students will be expected to

- B1 compute products of whole numbers and decimals
- B2 model and calculate the products of two decimals
- B3 compute quotients of whole numbers and decimals
- B4 model and calculate the quotients of two decimals
- B5 add and subtract simple fractions using models
- B6 demonstrate an understanding of the function nature of input-output situations

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO B: Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations. *(continued)*

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| <ul style="list-style-type: none"> • apply computational facts and procedures (algorithms) in a wide variety of problem situations involving whole numbers and decimals | 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 |
| <ul style="list-style-type: none"> • apply estimation techniques to predict, and justify the reasonableness of, results in relevant problem situations involving whole numbers and decimals | B9 estimate products and quotients involving whole numbers only, whole numbers and decimals, and decimals only
B11 calculate sums and differences in relevant contexts by using the most appropriate method |
| <ul style="list-style-type: none"> • select and use appropriate computational techniques (including mental, paper-and-pencil, and technological) in given situations | B10 divide numbers by 0.1, 0.01, and 0.001 mentally
B12 calculate products and quotients in relevant contexts by using the most appropriate method |
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GCO C: Students will explore, recognize, represent, and apply patterns and relationships, both informally and formally.

By the end of grade 6, students will be expected to

- describe, extend, and create a wide variety of patterns and relationships to model and solve problems involving real-world situations and mathematical concepts
- explore how a change in one quality in a relationship affects another
- represent mathematical patterns and relationships in a variety of ways (including rules, tables, and one- and two-dimensional graphs)
- solve linear equations using informal, non-algebraic methods

Students will be expected to

- 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 will affect areas of rectangles, parallelograms, or triangles
- C4 recognize and explain how an increase in height, width, or length of a rectangular prism changes its volume
- C5 recognize and explain how the 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 understanding of the use of letters to replace open frames

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO D: Students will demonstrate an understanding of and apply concepts and skills associated with measurement.

By the end of grade 6, students will be expected to

- extend understanding of measurement concepts and attributes to include volume, temperature, perimeter, and angle
- communicate using standard units, understand the relationship among commonly used SI units (e.g., mm, cm, m, km) and select appropriate units in given situations
- estimate and apply measurement concepts and skills in relevant problem situations and select and use appropriate tools and units
- develop and apply rules and procedures for determining measures (using concrete and graphing models)

Students will be expected to

- D1 use the relationship among particular SI units to compare objects
 - D2 describe mass measurements 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 continue to solve measurement problems involving length, capacity, area, volume, mass, and time
 - D7 demonstrate an understanding of the relationships among the base, height, and area of a parallelogram
 - D8 demonstrate an understanding of the relationship between the area of a triangle and the area of a related parallelogram
 - D9 demonstrate an understanding of the relationship among the three dimensions of a rectangular prism and its volume and its surface area
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GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.

By the end of grade 6, students will be expected to

- identify, draw, and build physical models of geometric figures
- solve problems using geometric relationships and spatial reasoning
- describe, model, and compare 2- and 3-D figures and shapes, explore their properties, and classify them in alternate ways

Students will be expected to

- 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, parallelograms, and rhombi
- E5 sort the members of the quadrilateral “family” under property headings
- E6 recognize, name, describe, and represent similar figures

Key-Stage Curriculum Outcomes Specific Curriculum Outcomes

GCO E: Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships. *(continued)*

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| <ul style="list-style-type: none"> • investigate and predict the results of transformations and begin to use them to compare shapes and explain geometric concepts (e.g., symmetry and similarity) | <p>E7 make generalizations about the planes of symmetry of 3-D shapes</p> <p>E8 make generalizations about the rotational symmetry property of all members of the quadrilateral “family” and of regular polygons</p> <p>E9 recognize and represent dilatation images of 2-D figures and make connections to similar figures</p> <p>E10 predict and represent the result of combining transformations</p> |
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GCO F: Students will solve problems involving the collection, display, and analysis of data.

By the end of grade 6, students will be expected to

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| <ul style="list-style-type: none"> • collect, organize, and describe relevant data in multiple ways | <p><i>Students will be expected to</i></p> <p>F1 choose and evaluate appropriate samples for data collection</p> <p>F2 identify various types of data sources</p> |
| <ul style="list-style-type: none"> • construct a variety of data displays (including tables, charts, and graphs) and consider their relative appropriateness | <p>F3 plot coordinates in four quadrants</p> <p>F4 use bar graphs, double bar graphs, and stem-and-leaf plots to display data</p> <p>F5 use circle graphs to represent data proportionally</p> |
| <ul style="list-style-type: none"> • read, interpret, and make and modify predictions from displays of relevant data | <p>F6 interpret data represented in scatterplots</p> <p>F7 make inferences from data displays</p> |
| <ul style="list-style-type: none"> • develop and apply measures of central tendency (mean, median, and mode) | <p>F8 demonstrate an understanding of the differences among mean, median, and mode</p> |
| <ul style="list-style-type: none"> • formulate and solve simple problems (both real-world and from other academic disciplines) that involve the collection, display, and analysis of data and explain conclusions which may be drawn | <p>F9 explore relevant issues for which data collection assists in reaching conclusions</p> |
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GCO G: Students will represent and solve problems involving uncertainty.

By the end of grade 6, students will be expected to

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| <ul style="list-style-type: none"> • explore, interpret, and make conjectures about everyday probability situations by estimating probabilities, conducting experiments, beginning to construct and conduct simulations, and analysing claims which they see and hear | <p><i>Students will be expected to</i></p> <p>G1 conduct simple simulations to determine probabilities</p> <p>G2 evaluate the reliability of sampling results</p> <p>G3 analyse simple probabilistic claims</p> |
| <ul style="list-style-type: none"> • determine theoretical probabilities using simple counting techniques | <p>G4 determine theoretical probabilities</p> |
| <ul style="list-style-type: none"> • demonstrate an understanding of the relationship between the numerical expression describing a probability and the events which give rise to the numbers | <p>G5 identify events that could be associated with a particular theoretical probability</p> |
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