Mathematics 5

Outcomes

NOVA SCOTIA
NOUVELLE-ÉCOSSE

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Mathematics Grade 5

Prepared by the Department of Education and Early Childhood Development

This is the most recent version of the current curriculum materials as used by teachers in Nova Scotia.

Mathematics Grade 5 Outcomes

N01 Students will be expected to represent and partition whole numbers to 1 000 000.

Performance Indicators:

- N01.01 Read a given numeral without using the word "and."
- N01.02 Record numerals for numbers expressed orally, concretely, pictorially, or symbolically as expressions, using proper spacing without commas.
- N01.03 Describe the pattern of adjacent place positions moving from right to left.
- N01.04 Explain the meaning of each digit in a given numeral.
- N01.05 Provide examples of large numbers used in print or electronic media.
- N01.06 Express a given numeral in expanded notation.
- N01.07 Write the numeral represented by a given expanded notation.
- N01.08 Compare and order numbers to 1 000 000 in a variety of ways.
- N01.09 Represent a given numeral, 0 to 1 000 000, using a place-value chart.
- N01.10 Represent a given number, 0 to 1 000 000, in a variety of ways, and explain how they are equivalent.
- N01.11 Represent a given number, 0 to 1 000 000, using expressions.
- N01.12 Read and write given numerals, 0 to 1 000 000, in words.

N02 Students will be expected to use estimation strategies, including front-end, front-end adjusted, rounding, and compatible numbers in problem-solving contexts.

Performance Indicators:

- N02.01 Provide a context for when estimation is used to make predictions, check the reasonableness of an answer, and determine approximate answers.
- N02.02 Describe contexts in which overestimating is important.
- N02.03 Determine the approximate solution to a given problem not requiring an exact answer.
- N02.04 Estimate a sum, a difference, a product, or a quotient using an appropriate strategy.
- N02.05 Select and explain an estimation strategy for a given problem.

N03 Students will be expected to describe and apply mental mathematics strategies and number properties to recall, with fluency, answers for basic multiplication facts to 81 and related division facts.

Performance Indicators:

- N03.01 Describe the mental mathematics strategy used to determine basic multiplication or division facts.
- N03.02 Explain why multiplying by 0 produces a product of 0 (zero property of multiplication).
- N03.03 Explain why division by 0 is not possible or is undefined (e.g., $8 \div 0$).
- N03.04 Quickly recall multiplication facts up to 9×9 and related division facts.

N04 Students will be expected to apply mental mathematics strategies for multiplication, including

- multiplying by multiples of 10, 100, and 1000
- halving and doubling
- using the distributive property

Performance Indicators:

N04.01 Determine the products when one factor is a multiple of 10, 100, or 1000.

N04.02 Apply halving and doubling when determining a given product (e.g., 32 × 5 is the same as 16 × 10).

N04.03 Apply the distributive property to determine a given product that involves multiplying factors that are close to multiples of 10 (e.g., 98 × 7 = (100 × 7) – (2 × 7)).

N05 Students will be expected to demonstrate, with and without concrete materials, an understanding of multiplication (two-digit by two-digit) to solve problems.

Performance Indicators:

N05.01 Model the multiplication of two two-digit factors, using concrete and visual representations of the area model, and record the process symbolically.

N05.02 Illustrate partial products in expanded notation for both factors (e.g., For 36 × 42, determine the partial products for (30 + 6) × (40 + 2).).

N05.03 Represent both two-digit factors in expanded notation to illustrate the distributive property; for example, to determine the partial products of 36 × 42, record
(30 + 6) × (40 + 2) = 30 × 40 + 30 × 2 + 6 × 40 + 6 × 2 = 1200 + 60 + 240 + 12 = 1512

N05.04 Describe a solution procedure for determining the product of two given two-digit factors, using a pictorial representation such as an area model.

N05.05 Solve a given multiplication problem in context, using personal strategies, and record the process.

N05.06 Create and solve multiplication story problems, and record the process symbolically.

N05.07 Determine the product of two given numbers using a personal strategy and record the process symbolically.

N06 Students will be expected to demonstrate, with and without concrete materials, an understanding of division (three-digit by one-digit), and interpret remainders to solve problems.

Performance Indicators:

N06.01 Model the division of two given numbers, using concrete or visual representations, and record the process symbolically.

N06.02 Explain that the interpretation of a remainder depends on the context.

- Ignore the remainder (e.g., making teams of four from 22 people [five teams, but two people are left over]).
- Round the quotient up (e.g., the number of five-passenger cars required to transport 13 people).
- Express remainders as fractions (e.g., five apples shared by two people).
- Express remainders as decimals (e.g., measurement and money).

N06.03 Solve a given division problem in context, using personal strategies, and record the process.

N06.04 Create and solve division story problems, and record the process symbolically.

N06.05 Determine the quotient of two given numbers using a personal strategy and record the process symbolically.

N07 Students will be expected to demonstrate an understanding of fractions by using concrete, pictorial, and symbolic representations to

- create sets of equivalent fractions
- compare and order fractions with like and unlike denominators

Performance Indicators:

N07.01 Represent a given fraction of one whole, set, linear model, or region using concrete materials.

N07.02 Create a set of equivalent fractions, and explain, using concrete materials, why there are many equivalent fractions for any given fraction.

N07.03 Model and explain that equivalent fractions represent the same quantity.

N07.04 Determine if two given fractions are equivalent, using concrete materials or pictorial representations.

N07.05 Identify equivalent fractions for a given fraction.

N07.06 Compare and order two given fractions with unlike denominators by creating equivalent fractions.

N07.07 Position a given set of fractions with like and unlike denominators on a number line, and explain strategies used to determine the order.

N07.08 Formulate and verify a personal strategy for developing a set of equivalent fractions.

N08 Students will be expected to describe and represent decimals (tenths, hundredths, and thousandths) concretely, pictorially, and symbolically.

Performance Indicators:

N08.01 Write the decimal for a given concrete or pictorial representation of part of a set, part of a region, or of a unit of measure.

N08.02 Represent a given decimal using concrete materials or a pictorial representation.

N08.03 Represent an equivalent tenth, hundredth, or thousandth for a given decimal, using concrete or visual representations.

N08.04 Express a given tenth as an equivalent hundredth and thousandth.

N08.05 Express a given hundredth as an equivalent thousandth.

N08.06 Explain the value of each digit in a given decimal.

N09 Students will be expected to relate decimals to fractions and fractions to decimals (to thousandths).

Performance Indicators:

N09.01 Express, orally and symbolically, a given fraction with a denominator of 10, 100, or 1000 as a decimal.

N09.02 Read decimals as fractions (e.g., 0.45 is read as zero and forty-five hundredths).

N09.03 Express, orally and symbolically, a given decimal in fraction form.

N09.04 Represent the fractions $\frac{1}{2}$,$\frac{1}{4}$,$\frac{3}{4}$ and as decimals using base-ten blocks, grids, and number lines.

N09.05 Express a given pictorial or concrete representation as a fraction or decimal (e.g., 250 shaded squares on a thousandth grid can be expressed as 0.250 or$\frac{250}{1000}$).

N10 Students will be expected to compare and order decimals (to thousandths) by using benchmarks, place value, and equivalent decimals.

Performance Indicators:

N10.01 Compare and order a given set of decimals by placing them on a number line that contains the benchmarks 0.0, 0.5, and 1.0.
N10.02 Compare and order a given set of decimals including only tenths using place value.
N10.03 Compare and order a given set of decimals including only hundredths using place value.
N10.04 Compare and order a given set of decimals including only thousandths using place value.
N10.05 Explain what is the same and what is different about 0.2, 0.20, and 0.200.
N10.06 Compare and order a given set of decimals, including tenths, hundredths, and thousandths, using equivalent decimals.

N11 Students will be expected to demonstrate an understanding of addition and subtraction of decimals (limited to thousandths).

Performance Indicators:

N11.01 Predict sums and differences of decimals using estimation strategies.
N11.02 Use estimation to correct errors of decimal point placements in sums and differences without using paper and pencil.
N11.03 Explain why keeping track of place-value positions is important when adding and subtracting decimals.
N11.04 Solve problems that involve addition and subtraction of decimals, limited to thousandths, using personal strategies.

PR01 Students will be expected to determine the pattern rule to make predictions about subsequent terms.

Performance Indicators:

PR01.01 Extend a given increasing or decreasing pattern, with and without concrete materials, and explain how each term differs from the preceding one.
PR01.02 Describe, orally or in written form, a given pattern using mathematical language such as one more, one less, or five more.
PR01.03 Write a mathematical expression to represent a given pattern, such as $r + 1$, $r - 1$, $r + 5$.
PR01.04 Describe the relationship in a given table or chart using a mathematical expression.
PR01.05 Determine and explain why a given number is or is not the next term in a pattern.
PR01.06 Predict subsequent terms in a given pattern.
PR01.07 Solve a given problem by using a pattern rule to determine subsequent terms.
PR01.08 Represent a given pattern visually to verify predictions.

PR02 Students will be expected to solve problems involving single-variable, one-step equations with whole number coefficients and whole number solutions.

Performance Indicators:

PR02.01 Explain the purpose of the letter variable in a given addition, subtraction, multiplication, or division equation with one unknown (e.g., $36 \div n = 6$).
PR02.02 Express a given pictorial or concrete representation of an equation in symbolic form.
PR02.03 Express a given problem as an equation where the unknown is represented by a letter variable.
PR02.04 Create a problem for a given equation with one unknown.

PR02.05 Solve a given single-variable equation with the unknown in any of the terms (e.g., $n + 2 = 5$, $4 + a = 7$, $6 = r - 2$, $10 = 2c$, $15 \div r = 3$).

PR02.06 Identify the unknown in a problem; represent the problem with an equation; and solve the problem concretely, pictorially, or symbolically.

M01 Students will be expected to design and construct different rectangles, given a perimeter or an area or both (whole numbers), and make generalizations.

Performance Indicators:

M01.01 Draw two or more rectangles for a given perimeter in a problem-solving context.

M01.02 Draw two or more rectangles for a given area in a problem-solving context.

M01.03 Determine the shape that will result in the greatest area for any given perimeter.

M01.04 Determine the shape that will result in the least area for any given perimeter.

M01.05 Provide a real-life context for when it is important to consider the relationship between area and perimeter.

M02 Students will be expected to demonstrate an understanding of measuring length (mm) by

- selecting and justifying referents for the unit millimetre (mm)
- modelling and describing the relationship between millimetre (mm) and centimetre (cm) units, and between millimetre (mm) and metre (m) units

Performance Indicators:

M02.01 Provide a referent for one millimetre, and explain the choice.

M02.02 Provide a referent for one centimetre, and explain the choice.

M02.03 Provide a referent for one metre, and explain the choice.

M02.04 Show that 10 millimetres is equivalent to one centimetre, using concrete materials.

M02.05 Show that 1000 millimetres is equivalent to one metre, using concrete materials.

M02.06 Provide examples of instances where millimetres are used as the unit of measure.

M02.07 Estimate and measure length in millimetres, centimetres, and metres.

M03 Students will be expected to demonstrate an understanding of volume by

- selecting and justifying referents for cubic centimetre (cm3) or cubic metre (m3) units
- estimating volume using referents for cubic centimetre (cm3) or cubic metre (m3)
- measuring and recording volume (cm3 or m3)
- constructing rectangular prisms for a given volume

Performance Indicators:

M03.01 Identify and explain why the cube is the most efficient unit for measuring volume.

M03.02 Provide a referent for a cubic centimetre, and explain the choice.

M03.03 Provide a referent for a cubic metre, and explain the choice.

M03.04 Determine which standard cubic unit is represented by a given referent.

M03.05 Estimate the volume of a given 3-D object using personal referents.

M03.06 Determine the volume of a given 3-D object using manipulatives, and explain the strategy.

M03.07 Construct a rectangular prism for a given volume.

M03.08 Construct more than one rectangular prism for a given volume.

M04 Students will be expected to demonstrate an understanding of capacity by

- describing the relationship between millilitre (mL) and litre (L) units
- selecting and justifying referents for millilitre (mL) and litre (L) units
- estimating capacity using referents for millilitre (mL) and litre (L)
- measuring and recording capacity (mL or L)

Performance Indicators:

M04.01 Demonstrate that 1000 millilitres is equivalent to one litre by filling a one-litre container using a combination of smaller containers.
M04.02 Provide a referent for one litre, and explain the choice.
M04.03 Provide a referent for one millilitre, and explain the choice.
M04.04 Determine the capacity unit of a given referent.
M04.05 Estimate the capacity of a given container using personal referents.
M04.06 Determine the capacity of a given container using materials that take the shape of the inside of the container (e.g., a liquid, rice, sand, beads), and explain the strategy.

G01 Students will be expected to describe and provide examples of edges and faces of 3-D objects, and sides of 2-D shapes that are parallel, intersecting, perpendicular, vertical, and horizontal.

Performance Indicators:

G01.01 Identify parallel, intersecting, perpendicular, vertical, and horizontal edges and faces on 3-D objects.
G01.02 Identify parallel, intersecting, perpendicular, vertical, and horizontal sides on 2-D shapes.
G01.03 Provide examples from the environment that show parallel, intersecting, perpendicular, vertical, and horizontal line segments.
G01.04 Find examples of edges, faces, and sides that are parallel, intersecting, perpendicular, vertical, and horizontal in print and electronic media, such as newspapers, magazines, and the Internet.
G01.05 Draw 2-D shapes that have sides that are parallel, intersecting, perpendicular, vertical, or horizontal.
G01.06 Build 3-D objects that have edges and faces that are parallel, intersecting, perpendicular, vertical, or horizontal.
G01.07 Describe the faces and edges of a given 3-D object using terms such as **parallel**, **intersecting**, **perpendicular**, **vertical**, or **horizontal**.
G01.08 Describe the sides of a given 2-D shape using terms such as **parallel**, **intersecting**, **perpendicular**, **vertical**, or **horizontal**.

G03 Students will be expected to perform a single transformation (translation, rotation, or reflection) of a 2-D shape (with and without technology) and draw and describe the image.

Performance Indicators:

G03.01 Translate a given 2-D shape horizontally, vertically, or diagonally, draw the image, and describe the position and orientation of the image.

G03.02 Rotate a given 2-D shape about a vertex, draw the image, and describe the position and orientation of the image.

G03.03 Reflect a given 2-D shape in a line of reflection, draw the image, and describe the position and orientation of the image.

G03.04 Perform a transformation of a given 2-D shape by following instructions.

G03.05 Draw a 2-D shape, translate the shape, and record the translation by describing the direction and magnitude of the movement.

G03.06 Draw a 2-D shape, rotate the shape about a vertex, and describe the direction of the turn (clockwise or counter-clockwise) and the fraction of the turn (limited to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or full turn).

G03.07 Draw a 2-D shape, reflect the shape, and identify the line of reflection and the distance of the image from the line of reflection.

G03.08 Predict the result of a single transformation of a 2-D shape and verify the prediction.

G05 Students will be expected to identify right angles.

Performance Indicators:

G05.01 Provide examples of right angles in the environment.

G05.02 Sketch right angles without the use of a protractor.

G05.03 Label a right angle, using a symbol.

G05.04 Identify angles greater than or less than a right angle.

SP01 Students will be expected to differentiate between first-hand and second-hand data.

Performance Indicators:

SP01.01 Explain the difference between first-hand and second-hand data.

SP01.02 Formulate a question that can best be answered using first-hand data and explain why.

SP01.03 Formulate a question that can best be answered using second-hand data and explain why.

SP01.04 Find examples of second-hand data in print and electronic media, such as newspapers, magazines, and the Internet.

SP02 Students will be expected to construct and interpret double bar graphs to draw conclusions.

Performance Indicators:

SP02.01 Determine the attributes (title, axes, intervals, and legend) of double bar graphs by comparing a given set of double bar graphs.

SP02.02 Represent a given set of data by creating a double bar graph, label the title and axes, and create a legend without the use of technology.

SP02.03 Draw conclusions from a given double bar graph to answer questions.

SP02.04 Identify examples of double bar graphs used in a variety of print and electronic media, such as newspapers, magazines, and the Internet.

SP02.05 Solve a given problem by constructing and interpreting a double bar graph.

SP03 Students will be expected to describe the likelihood of a single outcome occurring, using words such as impossible, possible, and certain.

Performance Indicators:

SP03.01 Identify examples of events from personal contexts that are impossible, possible, or certain.
SP03.02 Classify the likelihood of a single outcome occurring in a probability experiment as impossible, possible, or certain.
SP03.03 Design and conduct a probability experiment in which the likelihood of a single outcome occurring is impossible, possible, or certain.
SP03.04 Conduct a given probability experiment a number of times, record the outcomes, and explain the results.

SP04 Students will be expected to compare the likelihood of two possible outcomes occurring, using words such as less likely, equally likely, or more likely.

Performance Indicators:

SP04.01 Identify outcomes from a given probability experiment that are less likely, equally likely, or more likely to occur than other outcomes.
SP04.02 Design and conduct a probability experiment in which one outcome is less likely to occur than the other outcome.
SP04.03 Design and conduct a probability experiment in which one outcome is equally likely to occur as the other outcome.
SP04.04 Design and conduct a probability experiment in which one outcome is more likely to occur than the other outcome.