

Mathematics 4

Outcomes

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Mathematics Grade 4

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Mathematics Grade 4 Outcomes

N01 Students will be expected to represent and partition whole numbers to 10 000.

Performance Indicators:

- N01.01 Read a given four-digit numeral without using the word “and.”
- N01.02 Record numerals for numbers expressed orally, concretely, pictorially, and/or symbolically as expressions, using proper spacing without commas.
- N01.03 Write a given numeral, 0 to 10 000, in words.
- N01.04 Represent a given numeral using a place-value chart or diagrams.
- N01.05 Express a given numeral in expanded notation (e.g., $4321 = 4000 + 300 + 20 + 1$).
- N01.06 Write the numeral represented by a given expanded notation.
- N01.07 Explain the meaning of each digit in a given four-digit numeral.
- N01.08 Represent a given number in a variety of ways and explain how they are equivalent.
- N01.09 Read a given number word, 0 to 10 000.
- N01.10 Represent a given number using expressions.

N02 Students will be expected to compare and order numbers to 10 000.

Performance Indicators:

- N02.01 Order a given set of numbers in ascending or descending order, and explain the order by making references to place value.
- N02.02 Create and order three different four-digit numerals.
- N02.03 Identify the missing numbers in an ordered sequence and on a number line.
- N02.04 Identify incorrectly placed numbers in an ordered sequence and on a number line.
- N02.05 Place numbers in relative order on an open number line.
- N02.06 Place numbers on a number line containing benchmark numbers for the purpose of comparison.
- N02.07 Compare numbers based on a variety of methods.

N03 Students will be expected to demonstrate an understanding of addition and subtraction of numbers with answers to 10 000 (limited to three- and four-digit numerals) by:

- using personal strategies for adding and subtracting
- estimating sums and differences
- solving problems involving addition and subtraction

Performance Indicators:

- N03.01 Represent concretely, pictorially, and symbolically the addition and subtraction of whole numbers, limited to three- and four-digit numerals.
- N03.02 Determine the sum of two given numbers, limited to three- and four-digit numerals, using a personal strategy, and record the process symbolically.
- N03.03 Determine the difference of two given numbers, limited to three- and four-digit numerals, using a personal strategy, and record the process symbolically.
- N03.04 Describe a situation in which an estimate rather than an exact answer is sufficient.
- N03.05 Estimate sums and differences using different strategies.

- N03.06 Create and solve problems that involve addition and subtraction of two or more numbers, limited to three- and four-digit numerals.
- N03.07 Explain mental mathematics strategies that could be used to determine a sum or difference.
- N03.08 Determine a sum or difference of one-, two-, and three-digit numerals efficiently, using mental mathematics strategies.

N04 Students will be expected to apply and explain the properties of 0 and 1 for multiplication and the property of 1 for division.

Performance Indicators:

- N04.01 Determine the answer to a given question involving the multiplication of a number by 1, and explain the answer using the property of 1 in multiplication.
- N04.02 Determine the answer to a given question involving the multiplication of a number by 0, and explain the answer using the property of 0 in multiplication.
- N04.03 Determine the answer to a given question involving the division of a number by 1, and explain the answer using the property of 1 in division.

N05 Students will be expected to describe and apply mental mathematics strategies, to recall basic multiplication facts to 9×9 , and to determine related division facts.

Performance Indicators:

- N05.01 Describe the mental mathematics strategy used to determine basic multiplication or division facts.
- N05.02 Use and describe a personal strategy for determining the multiplication facts.
- N05.03 Use and describe a personal strategy for determining the division facts.
- N05.04 Quickly recall basic multiplication facts up to 9×9 .

N06 Students will be expected to demonstrate an understanding of multiplication (one-, two-, or three-digit by one-digit numerals) to solve problems:

- using personal strategies for multiplication, with and without concrete materials
- using arrays to represent multiplication
- connecting concrete representations to symbolic representations
- estimating products
- applying the distributive property

Performance Indicators:

- N06.01 Model a given multiplication problem, using the distributive property (e.g., $8 \times 365 = (8 \times 300) + (8 \times 60) + (8 \times 5)$).
- N06.02 Model the multiplication of two given numbers, limited to one-, two-, or three-digit by one-digit numerals, using concrete or visual representations, and record the process symbolically.
- N06.03 Create and solve multiplication story problems, limited to one-, two-, or three-digit by one-digit numerals, and record the process symbolically.
- N06.04 Estimate a product using a personal strategy (e.g., 2×243 is close to or a little more than 2×200 , or close to or a little less than 2×250).
- N06.05 Model and solve a given multiplication problem using an array, and record the process.
- N06.06 Determine the product of two given numbers using a personal strategy, and record the process symbolically.

N07 Students will be expected to demonstrate an understanding of division (one-digit divisor and up to two-digit dividend) to solve problems by:

- using personal strategies for dividing, with and without concrete materials
- estimating quotients
- relating division to multiplication

Performance Indicators:

- N07.01 Model the division of two given numbers without a remainder, limited to a one-digit divisor and up to a two-digit dividend, using concrete or visual representations, and record the process pictorially and symbolically.
- N07.02 Model the division of two given numbers with a remainder, limited to a one-digit divisor and up to a two-digit dividend, using concrete or visual representations, and record the process pictorially and symbolically. (It is not intended that remainders be expressed as decimals or fractions.)
- N07.03 Solve a given division problem, using a personal strategy, and record the process symbolically.
- N07.04 Create and solve division word problems involving a one- or two-digit dividend, and record the process pictorially and symbolically.
- N07.05 Estimate a quotient using a personal strategy (e.g., $86 \div 4$ is close to $80 \div 4$ or close to $80 \div 5$).
- N07.06 Solve a given division problem by relating division to multiplication (e.g., for $80 \div 4$, we know that $4 \times 20 = 80$, so $80 \div 4 = 20$).

N08 Students will be expected to demonstrate an understanding of fractions less than or equal to 1 by using concrete, pictorial, and symbolic representations to:

- name and record fractions for the parts of one whole or a set
- compare and order fractions
- model and explain that for different wholes, two identical fractions may not represent the same quantity
- provide examples of where fractions are used

Performance Indicators:

- N08.01 Represent a given fraction of one whole object, region, or a set using concrete materials.
- N08.02 Identify a fraction from its given concrete representation.
- N08.03 Name and record the shaded and non-shaded parts of a given whole object, region, or set.
- N08.04 Represent a given fraction pictorially by shading parts of a given whole object, region, or set.
- N08.05 Explain how denominators can be used to compare two given unit fractions with a numerator of 1.
- N08.06 Order a given set of fractions that have the same numerator, and explain the ordering.
- N08.07 Order a given set of fractions that have the same denominator, and explain the ordering.
- N08.08 Identify which of the benchmarks 0 , $\frac{1}{2}$, or 1 is closer to a given fraction.
- N08.09 Name fractions between two given benchmarks on a number line.
- N08.10 Order a given set of fractions by placing them on a number line with given benchmarks.
- N08.11 Provide examples of instances when two identical fractions may not represent the same quantity.
- N08.12 Provide, from everyday contexts, an example of a fraction that represents part of a set and an example of a fraction that represents part of one whole

N09 Students will be expected to describe and represent decimals (tenths and hundredths) concretely, pictorially, and symbolically.

Performance Indicators:

- N09.01 Write the decimal for a given concrete or pictorial representation of part of a set, part of a region, or part of a unit of measure.
- N09.02 Represent a given decimal using concrete materials or a pictorial representation.
- N09.03 Explain the meaning of each digit in a given decimal.
- N09.04 Represent a given decimal using money values (dimes and pennies).
- N09.05 Record a given money value using decimals.
- N09.06 Provide examples of everyday contexts in which tenths and hundredths are used.
- N09.07 Model, using manipulatives or pictures, that a given tenth can be expressed as a hundredth (e.g., 0.9 is equivalent to 0.90, or 9 dimes is equivalent to 90 pennies).
- N09.08 Read decimal numbers correctly.

N10 Students will be expected to relate decimals to fractions and fractions to decimals (to hundredths).

Performance Indicators:

- N10.01 Express, orally and symbolically, a given fraction with a denominator of 10 or 100 as a decimal.
- N10.02 Read decimals as fractions (e.g., 0.5 is zero and five tenths).
- N10.03 Express, orally and symbolically, a given decimal in fraction form.
- N10.04 Express a given pictorial or concrete representation as a fraction or decimal (e.g., 15 shaded squares on a hundredth grid can be expressed as 0.15 or $\frac{15}{100}$).
- N10.05 Express, orally and symbolically, the decimal equivalent for a given fraction (e.g., $\frac{50}{100}$ can be expressed as 0.50).

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

- estimating sums and differences
- using mental mathematics strategies to solve problems
- using personal strategies to determine sums and differences

Performance Indicators:

- N11.01 Predict sums and differences of decimals, using estimation strategies.
- N11.02 Solve problems, including money problems, that involve addition and subtraction of decimals (limited to hundredths), using personal strategies.
- N11.03 Ask students to determine which problems do not require an exact solution.
- N11.04 Determine the approximate solution of a given problem not requiring an exact answer.
- N11.05 Count back change for a given purchase.
- N11.06 Determine an exact solution using mental computation strategies.

PR01 Students will be expected to identify and describe patterns found in tables and charts, including a multiplication chart.

Performance Indicators:

PR01.01 Identify and describe a variety of patterns in a multiplication chart.

PR01.02 Determine the missing element(s) in a given table or chart.

PR01.03 Identify the error(s) in a given table or chart.

PR01.04 Describe the pattern found in a given table or chart.

PR02 Students will be expected to translate among different representations of a pattern (a table, a chart, or concrete materials).

Performance Indicators:

PR02.01 Create a table or chart from a given concrete representation of a pattern.

PR02.02 Create a concrete representation of a given pattern displayed in a table or chart.

PR02.03 Translate between pictorial, contextual, and concrete representations of a pattern.

PR02.04 Explain why the same relationship exists between the pattern in a table and its concrete representation.

PR03 Students will be expected to represent, describe, and extend patterns and relationships, using charts and tables, to solve problems.

Performance Indicators:

PR03.01 Translate the information in a given problem into a table or chart.

PR03.02 Identify, describe, and extend the patterns in a table or chart to solve a given problem.

PR04 Students will be expected to identify and explain mathematical relationships, using charts and diagrams, to solve problems.

Performance Indicators:

PR04.04 Identify a sorting rule for a given Venn diagram.

PR04.05 Describe the relationship shown in a given Venn diagram when the circles overlap, when one circle is contained in the other, and when the circles are separate.

PR04.06 Determine where new elements belong in a given Venn diagram.

PR04.07 Solve a given problem by using a chart or diagram to identify mathematical relationships.

PR05 Students will be expected to express a given problem as an equation in which a symbol is used to represent an unknown number.

Performance Indicators:

PR 05.01 Explain the purpose of the symbol in a given addition, subtraction, multiplication, or division equation with one unknown (e.g., $36 \div \quad = 6$).

PR 05.02 Express a given pictorial or concrete representation of an equation in symbolic form.

PR 05.03 Identify the unknown in a problem; represent the problem with an equation; and solve the problem concretely, pictorially, and/or symbolically.

PR 05.04 Create a problem in context for a given equation with one unknown.

PR06 Students will be expected to solve one-step equations involving a symbol to represent an unknown number.

Performance Indicators:

PR06.01 Represent and solve a given one-step equation concretely, pictorially, or symbolically.

PR06.02 Solve a given one-step equation using guess and test.

PR06.03 Describe, orally, the meaning of a given one-step equation with one unknown.

PR06.04 Solve a given equation when the unknown is on the left or right side of the equation.

PR06.05 Represent and solve a given addition or subtraction problem involving a “part-part-whole” or comparison context using a symbol to represent the unknown.

PR06.06 Represent and solve a given multiplication or division problem involving equal grouping or partitioning (equal sharing) using symbols to represent the unknown.

PR06.07 Solve equations using a symbol to represent the unknown.

M01 Students will be expected to read and record time using digital and analog clocks, including 24-hour clocks.

Performance Indicators:

M01.01 State the number of hours in a day.

M01.02 Express the time orally and numerically from a 12-hour analog clock.

M01.03 Express the time orally and numerically from a 24-hour analog clock.

M01.04 Express the time orally and numerically from a 12-hour digital clock.

M01.05 Express the time orally and numerically from a 24-hour digital clock.

M01.06 Describe time orally as “minutes to” or “minutes after” the hour.

M01.07 Explain the meaning of a.m. and p.m., and provide an example of an activity that occurs during the a.m., and another that occurs during the p.m.

M03 Students will be expected to demonstrate an understanding of area of regular and irregular 2-D shapes by:

- recognizing that area is measured in square units
- selecting and justifying referents for the units square centimetre (cm^2) or square metre (m^2)
- estimating area using referents for cm^2 or m^2
- determining and recording area (cm^2 or m^2)
- constructing different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area

Performance Indicators:

M03.01 Describe area as the measure of surface recorded in square units.

M03.02 Identify and explain why the square is the most efficient unit for measuring area.

M03.03 Provide a referent for a square centimetre, and explain the choice.

M03.04 Provide a referent for a square metre, and explain the choice.

M03.05 Determine which standard square unit is represented by a given referent.

M03.06 Estimate the area of a given 2-D shape using personal referents.

M03.07 Determine the area of a regular 2-D shape, and explain the strategy.

M03.08 Determine the area of an irregular 2-D shape, and explain the strategy.

M03.09 Construct a rectangle for a given area.

M03.10 Demonstrate that many rectangles are possible for a given area by drawing at least two different rectangles for the same given area.

G01 Students will be expected to describe and construct rectangular and triangular prisms.

Performance Indicators:

- G01.01 Identify and name common attributes of rectangular prisms from given sets of rectangular prisms.
- G01.02 Identify and name common attributes of triangular prisms from given sets of triangular prisms.
- G01.03 Sort a given set of right rectangular and triangular prisms, using the shape of the base.
- G01.04 Construct and describe a model of a rectangular and a triangular prism, using materials such as pattern blocks or modelling clay.
- G01.05 Construct rectangular prisms from their nets.
- G01.06 Construct triangular prisms from their nets.
- G01.07 Identify examples of rectangular and triangular prisms found in the environment.

G03 Students will be expected to demonstrate an understanding of line symmetry by:

- identifying symmetrical 2-D shapes
- creating symmetrical 2-D shapes
- drawing one or more lines of symmetry in a 2-D shape

Performance Indicators:

- G03.01 Identify the characteristics of given symmetrical and non-symmetrical 2-D shapes.
- G03.02 Sort a given set of 2-D shapes as symmetrical and non-symmetrical.
- G03.03 Complete a symmetrical 2-D shape, given one-half the shape and its line of symmetry, and explain the process.
- G03.04 Identify lines of symmetry of a given set of 2-D shapes, and explain why each shape is symmetrical.
- G03.05 Determine whether or not a given 2-D shape is symmetrical by using an image reflector or by folding and superimposing.
- G03.06 Create a symmetrical shape with and without manipulatives and explain the process.
- G03.07 Provide examples of symmetrical shapes found in the environment, and identify the line(s) of symmetry.
- G03.08 Sort a given set of 2-D shapes as those that have no lines of symmetry, one line of symmetry, or more than one line of symmetry.
- G03.09 Explain connections between congruence and symmetry using 2-D shapes.

SP01 Students will be expected to demonstrate an understanding of many-to-one correspondence.

Performance Indicators:

- SP01.01 Compare graphs in which the same data has been displayed using one-to-one and many-to-one correspondences, and explain how they are the same and different.
- SP01.02 Explain why many-to-one correspondence is sometimes used rather than one-to-one correspondence.
- SP01.03 Find examples of graphs in print and electronic media, such as newspapers, magazines, and the Internet, in which many-to-one correspondence is used; and describe the correspondence used.

SP02 Students will be expected to construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions.

Performance Indicators:

SP02.01 Identify an interval and correspondence for displaying a given set of data in a graph, and justify the choice.

SP02.02 Create and label (with categories, title, and legend) a pictograph to display a given set of data, using many-to-one correspondence, and justify the choice of correspondence used.

SP02.03 Create and label (with axes and title) a bar graph to display a given set of data, using many-to-one correspondence, and justify the choice of interval used.

SP02.04 Answer a given question, using a given graph in which data is displayed using many-to-one correspondence.