



Below you will find outcomes from the elementary program of studies related to multiplicative thinking as the EMPL team sees it. Other outcomes may be closely related but were not included in this project.

+Grade Two

N 7	Illustrate, concretely and pictorially, the meaning of place value for numerals to 100. [C, CN, R, V]
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+Grade Three

N 5	Illustrate, concretely and pictorially, the meaning of place value for numerals to 1000. [C, CN, R, V]
N 11	Demonstrate an understanding of multiplication to 5×5 by: <ul style="list-style-type: none">representing and explaining multiplication using equal grouping and arrayscreating and solving problems in context that involve multiplicationmodeling multiplication using concrete and visual representations, and recording the process symbolicallyrelating multiplication to repeated additionrelating multiplication to division. [C, CN, PS, R] <i>Clarification:</i> Understand and recall multiplication facts to 5×5 .
N 12	Demonstrate an understanding of division (limited to division related to multiplication facts up to 5×5) by: <ul style="list-style-type: none">representing and explaining division using equal sharing and equal groupingcreating and solving problems in context that involve equal sharing and equal groupingmodeling equal sharing and equal grouping using concrete and visual representations, and recording the process symbolicallyrelating division to repeated subtractionrelating division to multiplication. [C, CN, PS, R]

+Grade Four

N 1	Represent and describe whole numbers to 10 000, pictorially and symbolically. [C, CN, R, V]
N 4	Apply the properties of 0 and 1 for multiplication and the property of 1 for division. [C, CN, R]
N 5	<p>Describe and apply mental mathematics strategies, such as:</p> <ul style="list-style-type: none">• skip counting from a known fact• using doubling or halving• using doubling or halving and adding or subtracting one more group• using patterns in the 9s facts• using repeated doubling to determine basic multiplication facts to 9×9 and related division facts. [C, CN, ME, R] <p><i>Clarification:</i> Understand and apply strategies for multiplication and related division facts to 9×9 Recall multiplication and related division facts to 7×7.</p>
N 6	<p>Demonstrate an understanding of multiplication (2- or 3-digit by 1-digit) to solve problems by:</p> <ul style="list-style-type: none">• 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. [C, CN, ME, PS, R, V]
N 7	<p>Demonstrate an understanding of division (1-digit divisor and up to 2-digit dividend) to solve problems by:</p> <ul style="list-style-type: none">• using personal strategies for dividing with and without concrete materials• estimating quotients• relating division to multiplication. [C, CN, ME, PS, R, V]

+Grade Five

N 1	Represent and describe whole numbers to 1 000 000. [C, CN, V, T]
N 3	<p>Apply mental mathematics strategies and number properties, such as:</p> <ul style="list-style-type: none">• skip counting from a known fact• using doubling or halving• using patterns in the 9s facts• using repeated doubling or halving in order to understand and recall basic multiplication facts (multiplication tables) to 81 and related division facts. [C, CN, ME, R, V] <p><i>Clarification:</i> Understand, recall and apply multiplication and related division facts to 9×9.</p>

N 4	Apply mental mathematics strategies for multiplication, such as: <ul style="list-style-type: none"> • annexing then adding zero • halving and doubling • using the distributive property. [C, CN, ME, R, V]
N 5	Demonstrate, with and without concrete materials, an understanding of multiplication (2-digit by 2-digit) to solve problems. [C, CN, PS, V]
N 6	Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit), and interpret remainders to solve problems. [C, CN, ME, PS, R, V]
P/R 3	Solve problems involving single-variable, one-step equations with whole number coefficients and whole number solutions. [C, CN, PS, R]

+Grade Six

N 1	Demonstrate an understanding of place value, including numbers that are: <ul style="list-style-type: none"> • greater than one million • less than one thousandth [C, CN, R, T]
N 2	Solve problems involving whole numbers and decimal numbers. [ME, PS, T]
N 3	Demonstrate an understanding of factors and multiples by: <ul style="list-style-type: none"> • determining multiples and factors of numbers less than 100 • identifying prime and composite numbers • solving problems using multiples and factors. [CN, PS, R, V]
N 4	Relate improper fractions to mixed numbers and mixed numbers to improper fractions. [CN, ME, R, V]
N 5	Demonstrate an understanding of ratio, concretely, pictorially and symbolically. [C, CN, PS, R, V]
N 6	Demonstrate an understanding of percent (limited to whole numbers), concretely, pictorially and symbolically. [C, CN, PS, R, V]
N 8	Demonstrate an understanding of multiplication and division of decimals (1-digit whole number multipliers and 1-digit natural number divisors). [C, CN, ME, PS, R, V]

