

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

+ Kindergarten

N 5	Compare quantities 1 to 10, using one-to-one correspondence. [C, CN, V] <i>*This outcome is identified as "Pre-Operations"</i>
-----	---

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

## + Grade 1

N 2	<p>Subitize (recognize at a glance) and name familiar arrangements of 1 to 10 objects or dots. [C, CN, ME, V] <i>*This outcome is identified as "Pre-Operations"</i></p>
N 5	<p>Compare sets containing up to 20 elements, using:</p> <ul style="list-style-type: none"> <li>• referents</li> <li>• one-to-one correspondence</li> </ul> <p>to solve problems. [C, CN, ME, PS, R, V] <i>*This outcome is identified as "Pre-Operations"</i></p>
N 8	<p>Identify the number, up to 20, that is:</p> <ul style="list-style-type: none"> <li>• one more</li> <li>• two more</li> <li>• one less</li> <li>• two less</li> </ul> <p>than a given number. [C, CN, ME, R, V] <i>*This outcome is identified as "Pre-Operations"</i></p>
N 9	<p>Demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially and symbolically, by:</p> <ul style="list-style-type: none"> <li>• using familiar mathematical language to describe additive and subtractive actions</li> <li>• creating and solving problems in context that involve addition and subtraction</li> <li>• modeling addition and subtraction, using a variety of concrete and visual representations, and recording the process symbolically.</li> </ul> <p>[C, CN, ME, PS, R, V]</p>
N 10	<p>Describe and use mental mathematics strategies for subtraction for basic addition facts and related subtraction facts to 18. [C, CN, ME, PS, R, V]</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Understand and apply strategies for addition and related subtraction facts to 18. Recall addition and related subtraction facts to 5.</p> </div>

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

+ Grade 2

N 8	Demonstrate and explain the effect of adding zero to, or subtracting zero from, any number.[C, R]
N 9	<p>Demonstrate an understanding of addition (limited to 1- and 2-digit numerals) with answers to 100 and the corresponding subtraction by:</p> <ul style="list-style-type: none"> <li>• using personal strategies for adding and subtracting with and without the support of manipulatives</li> <li>• creating and solving problems that involve addition and subtraction</li> <li>• using the commutative property of addition (the order in which numbers are added does not affect the sum)</li> <li>• using the associative property of addition (grouping a set of numbers in different ways does not affect the sum)</li> <li>• explaining that the order in which numbers are subtracted may affect the difference.</li> </ul> <p>[C, CN, ME, PS, R, V]</p> <p><i>Note: Students investigate a variety of strategies, including standard/traditional algorithms, to become proficient in at least one appropriate and efficient strategy that they understand.</i></p>
N 10	<p>Apply mental mathematics strategies for basic addition facts and related subtraction facts to 18.</p> <p>[C, CN, ME, PS, R, V]</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Understand and apply strategies for addition facts up to and including <math>9 + 9</math> and related subtraction facts. Recall addition and related subtraction facts to <math>5 + 5</math>.</p> </div>

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

## + Grade 3

N 6	Describe and apply mental mathematics strategies for adding two 2-digit numerals. [C, CN, ME, PS, R, V]
N 7	Describe and apply mental mathematics strategies for subtracting two 2-digit numerals. [C, CN, ME, PS, R, V]
N 8	Apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem-solving context [C, ME, PS, R]
N 9	Demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1-, 2- and 3-digit numerals), concretely, pictorially and symbolically, by: <ul style="list-style-type: none"> <li>• using personal strategies for adding and subtracting with and without the support of manipulatives</li> <li>• creating and solving problems in context that involve addition and subtraction of numbers.</li> </ul> [C, CN, ME, PS, R, V]  <i>Note: Students investigate a variety of strategies, including standard/traditional algorithms, to become proficient in at least one appropriate and efficient strategy that they understand.</i>
N 10	Apply mental mathematics strategies and number properties in order to understand and recall basic addition facts and related subtraction facts to 18. [C, CN, ME, PS, R, V]  <div style="border: 1px solid black; padding: 2px;">Understand, recall and apply facts up to and including <math>9 + 9</math> and related subtract facts.</div>
P/R 4	Solve one-step addition and subtraction equations involving a symbol to represent an unknown number. [C, CN, PS, R, V]

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

## + Grade 4

N 3 <sup>1</sup>	<p>Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals) by:</p> <ul style="list-style-type: none"> <li>• using personal strategies for adding and subtracting</li> <li>• estimating sums and differences</li> <li>• solving problems involving addition and subtraction.</li> </ul> <p>[C, CN, ME, PS, R]</p> <p>Note: Students investigate a variety of strategies, including standard/traditional algorithms, to become proficient in at least one appropriate and efficient strategy that they understand.</p>
N 11 <sup>1</sup>	<p>Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by:</p> <ul style="list-style-type: none"> <li>• using personal strategies to determine sums and differences</li> <li>• estimating sums and differences using mental mathematics strategies to solve problems.</li> </ul> <p>[C, ME, PS, R, V]</p>
P/R 6 <sup>1</sup>	<p>Solve one-step equations involving a symbol to represent an unknown number.</p> <p>[C, CN, PS, R, V]</p>

<sup>1</sup> Note: Through this outcome, students have the opportunity to maintain and refine previously learned addition and subtraction number facts:

Grade 3, Number SO 10 – Apply mental mathematics strategies and number properties in order to understand and recall basic addition facts and related subtraction facts to 18. [C, CN, ME, PS, R, V]

Understand, recall and apply addition facts up to and including  $9 + 9$  and related subtraction facts

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

## + Grade 5

N 11	<p>Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths). [C, CN, PS, R, V]</p> <p><i>Note: Through this outcome, students have the opportunity to maintain and refine previously learned operations of addition and subtraction with whole numbers:</i> Grade 4, Number SO 3 – Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals) by:</p> <ul style="list-style-type: none"> <li>• using personal strategies for adding and subtracting</li> <li>• estimating sums and differences</li> <li>• solving problems involving addition and subtraction. [C, CN, ME, PS, R]</li> </ul>
------	---

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

## + Grade 6

N 2

Solve problems involving whole numbers and decimal numbers.

[ME, PS, T]

*Note: Through this outcome, students have the opportunity to maintain and refine previously learned:*

- *multiplication and division number facts:*

*Grade 5, Number SO 3 – Apply mental mathematics strategies and number properties in order to understand and recall basic multiplication facts (multiplication tables) to 81 and related division facts. [C, CN, ME, R, V]*

*Understand, recall and apply multiplication and related division facts to  $9 \times 9$ .*

- *operations with whole numbers:*

*Grade 4, Number SO 3 – Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals) by:*

- *using personal strategies for adding and subtracting*
- *estimating sums and differences*
- *solving problems involving addition and subtraction. [C, CN, ME, PS, R]*

*Grade 5, Number SO 5 – Demonstrate, with and without concrete materials, an understanding of multiplication (2-digit by 2-digit) to solve problems. [C, CN, PS, V]*

*Grade 5, Number SO 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]*