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

<table>
<thead>
<tr>
<th>N 5</th>
<th>Compare quantities 1 to 10, using one-to-one correspondence. [C, CN, V]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*This outcome is identified as “Pre-Operations”</td>
</tr>
</tbody>
</table>
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 | Subitize (recognize at a glance) and name familiar arrangements of 1 to 10 objects or dots.  
|     | [C, CN, ME, V]  
|     | *This outcome is identified as “Pre-Operations”  

| N 5 | Compare sets containing up to 20 elements, using:  
|     | - referents  
|     | - one-to-one correspondence  
|     | to solve problems.  
|     | [C, CN, ME, PS, R, V]  
|     | *This outcome is identified as “Pre-Operations”  

| N 8 | Identify the number, up to 20, that is:  
|     | - one more  
|     | - two more  
|     | - one less  
|     | - two less  
|     | than a given number.  
|     | [C, CN, ME, R, V]  
|     | *This outcome is identified as “Pre-Operations”  

| N 9 | Demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially and symbolically, by:  
|     | - using familiar mathematical language to describe additive and subtractive actions  
|     | - creating and solving problems in context that involve addition and subtraction  
|     | - modeling addition and subtraction, using a variety of concrete and visual representations, and recording the process symbolically.  
|     | [C, CN, ME, PS, R, V]  

| N 10 | Describe and use mental mathematics strategies for subtraction for basic addition facts and related subtraction facts to 18.  
|      | [C, CN, ME, PS, R, V]  

Understand and apply strategies for addition and related subtraction facts to 18. Recall addition and related subtraction facts to 5.
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

<table>
<thead>
<tr>
<th>N 8</th>
<th>Demonstrate and explain the effect of adding zero to, or subtracting zero from, any number. [C, R]</th>
</tr>
</thead>
</table>
| N 9  | Demonstrate an understanding of addition (limited to 1- and 2-digit numerals) with answers to 100 and the corresponding subtraction by:  
- using personal strategies for adding and subtracting with and without the support of manipulatives  
- creating and solving problems that involve addition and subtraction  
- using the commutative property of addition (the order in which numbers are added does not affect the sum)  
- using the associative property of addition (grouping a set of numbers in different ways does not affect the sum)  
- explaining that the order in which numbers are subtracted may affect the difference.  
[C, CN, ME, PS, R, V]  
**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. |
| N 10 | Apply mental mathematics strategies for basic addition facts and related subtraction facts to 18.  
[C, CN, ME, PS, R, V]  
Understand and apply strategies for addition facts up to and including 9 + 9 and related subtraction facts. Recall addition and related subtraction facts to 5 + 5. |
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

<table>
<thead>
<tr>
<th>N 6</th>
<th>Describe and apply mental mathematics strategies for adding two 2-digit numerals. [C, CN, ME, PS, R, V]</th>
</tr>
</thead>
<tbody>
<tr>
<td>N 7</td>
<td>Describe and apply mental mathematics strategies for subtracting two 2-digit numerals. [C, CN, ME, PS, R, V]</td>
</tr>
<tr>
<td>N 8</td>
<td>Apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem-solving context [C, ME, PS, R]</td>
</tr>
</tbody>
</table>
| 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:  
- using personal strategies for adding and subtracting with and without the support of manipulatives  
- creating and solving problems in context that involve addition and subtraction of numbers. [C, CN, ME, PS, R, V]  
*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.* |
| 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]  
*Understand, recall and apply facts up to and including 9 + 9 and related subtract facts.* |
| 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

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Description</th>
</tr>
</thead>
</table>
| N 3¹ | 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]  
  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. |
| N 11¹ | Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by:  
  - using personal strategies to determine sums and differences  
  - estimating sums and differences using mental mathematics strategies to solve problems.  
  [C, ME, PS, R, V] |
| P/R 6¹ | Solve one-step equations involving a symbol to represent an unknown number.  
  [C, CN, PS, R, V] |

¹ 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 Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths).
[C, CN, PS, R, V]

Note: Through this outcome, students have the opportunity to maintain and refine previously learned operations of addition and subtraction 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]
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

<table>
<thead>
<tr>
<th>N 2</th>
<th>Solve problems involving whole numbers and decimal numbers. [ME, PS, T]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Note: Through this outcome, students have the opportunity to maintain and refine previously learned:</td>
</tr>
<tr>
<td></td>
<td>multiplication and division number facts:</td>
</tr>
<tr>
<td></td>
<td>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]</td>
</tr>
<tr>
<td></td>
<td>Understand, recall and apply multiplication and related division facts to 9×9.</td>
</tr>
<tr>
<td></td>
<td>operations with whole numbers:</td>
</tr>
<tr>
<td></td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>using personal strategies for adding and subtracting</td>
</tr>
<tr>
<td></td>
<td>estimating sums and differences</td>
</tr>
<tr>
<td></td>
<td>solving problems involving addition and subtraction. [C, CN, ME, PS, R]</td>
</tr>
<tr>
<td></td>
<td>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]</td>
</tr>
<tr>
<td></td>
<td>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]</td>
</tr>
</tbody>
</table>