

# **Joliet Public Schools District 86**

## **Vertical Alignment of Operation Fluency**

This document details the progression of the operation-related standards moving from Kindergarten through 6<sup>th</sup> grade. It also details the fluency standards addressed at each grade level.

Grade	K	1	2	3	4
<b>Operations</b>					
<b>Addition/Subtraction</b>	<p>Represent addition and subtraction with:</p> <ul style="list-style-type: none"> <li>• Objects</li> <li>• Fingers</li> <li>• Mental images</li> <li>• Drawings</li> <li>• Sounds</li> <li>• Acting out situations</li> <li>• Verbal explanations</li> <li>• Expressions</li> <li>• Equations</li> </ul> <p>Decompose numbers less than or equal to 10 into pairs in more than one way</p> <p>For any number from 1 to 9, find the number that makes 10 when added to the given number</p> <p>Compose and decompose numbers from 11 to 19 into ten ones and some further ones</p> <p><b>Solve</b> addition and subtraction word problems within 10</p> <ul style="list-style-type: none"> <li>• Use objects or drawings to represent the problem</li> </ul>	<p><b>Add and subtract</b> within 20</p> <ul style="list-style-type: none"> <li>• Counting on</li> <li>• Making 10</li> <li>• Decomposing a number leading to a 10</li> <li>• Using relationship between addition and subtraction</li> <li>• Creating equivalent but easier or known sums</li> </ul> <p><b>Add</b> within 100</p> <p><b>Add</b> two-digit number and a one-digit number</p> <p><b>Add</b> two-digit number and a multiple of 10</p> <p><b>Subtract</b> multiples of 10 from multiples of 10 in the range of 10-90 For all of the above:</p> <ul style="list-style-type: none"> <li>• Concrete models or drawings</li> <li>• Strategies based on place value, properties of operations, and/or the relationship between addition and subtraction</li> <li>• Introduce 100s Chart</li> </ul> <p><b>Solve</b> addition and subtraction word problems within 20</p> <ul style="list-style-type: none"> <li>• Situations involving adding to, taking from, putting together, taking apart, and comparing</li> <li>• Use objects, drawings, and equations with a symbol for the unknown number to represent the problem</li> </ul>	<p>Add and subtract within 1000</p> <ul style="list-style-type: none"> <li>• Concrete models or drawings</li> <li>• Strategies based on place value, properties of operations, and/or the relationship between addition and subtraction</li> </ul> <p>Represent whole-number sums and differences within 100 on a number line diagram</p> <p><b>Solve</b> one- and two-step addition and subtraction word problems within 100</p> <ul style="list-style-type: none"> <li>• Situations involving adding to, taking from, putting together, taking apart, and comparing</li> <li>• Situations involving lengths that are given in the same units</li> <li>• Unknowns in all positions</li> <li>• Use drawings and equations with a symbol for the unknown number to represent the problem</li> </ul>	<p><b>Solve</b> two-step problems using the four operations</p> <ul style="list-style-type: none"> <li>• Assess reasonableness of answers using mental computation and estimation strategies</li> </ul>	<p><b>Solve</b> multi-step word problems posed with whole numbers and having whole-number answers using the four operations</p> <ul style="list-style-type: none"> <li>• Assess reasonableness of answers using mental computation and estimation strategies</li> </ul>
<b>Math Fact Fluency</b>	<p><b>Fluently</b> add and subtract within 5</p>	<p><b>Fluently</b> add and subtract within 10</p> <p>Mentally find 10 more or 10 less without having to count</p>	<p><b>Fluently</b> add and subtract within 100</p> <ul style="list-style-type: none"> <li>• Strategies based on place value, properties of operations, and/or the relationship between addition and subtraction</li> </ul> <p><b>Mentally</b> add and subtract within 20</p> <p><b>Mentally</b> add/subtract 10 or 100 to/from any number 100-900</p> <p><b>Know from memory</b> all sums of two one-digit numbers (by the end of the 2nd grade)</p>	<p><b>Fluently</b> add and subtract within 1000</p> <ul style="list-style-type: none"> <li>• Strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction</li> </ul>	<p><b>Fluently</b> add and subtract multi-digit whole numbers using the standard algorithm</p>

Grade	2	3	4	5	6
<b>Operations</b>					
<b>Multiplication/Division</b>	<p>Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns</p>	<p>Multiply one-digit whole numbers by multiples of 10 in the range 10-90</p> <ul style="list-style-type: none"> <li>• Use strategies based on place value and properties of operations</li> </ul> <p>Understand division as an unknown-factor problem</p> <p>Relate area to the operations of multiplication and addition</p> <p><b>Solve</b> multiplication and division word problems within 100, involving:</p> <ul style="list-style-type: none"> <li>• Equal groups</li> <li>• Arrays</li> <li>• Measurement quantities</li> </ul> <p>Solve two-step problems using the four operations</p> <ul style="list-style-type: none"> <li>• Assess reasonableness of answers using mental computation and estimation strategies</li> </ul>	<p>Multiply a whole number four digits by one-digit</p> <p>- two two-digit numbers</p> <p>Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors</p> <p>For all of the above:</p> <ul style="list-style-type: none"> <li>• Use strategies based on place value, properties of operations, and/or the relationship between multiplication and division</li> <li>• Illustrate and explain the calculation by using <ul style="list-style-type: none"> <li>o Equations (Partial Products/Partial Quotients)</li> <li>o Rectangular arrays</li> <li>o Area models</li> </ul> </li> </ul> <p><b>Solve</b> multiplication and division word problems involving:</p> <ul style="list-style-type: none"> <li>• Multiplicative comparison</li> </ul> <p><b>Solve</b> multi-step word problems posed with whole numbers and having whole-number answers using the four operations</p> <ul style="list-style-type: none"> <li>• Assess reasonableness of answers using mental computation and estimation strategies</li> </ul> <p>- Interpret remainders</p>	<p>Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors</p> <ul style="list-style-type: none"> <li>• Use strategies based on placevalue, properties of operations, and/or the relationship between multiplication and division</li> <li>• Illustrate and explain the calculation by using <ul style="list-style-type: none"> <li>o Equations (partial quotients)</li> <li>o Rectangular arrays</li> <li>o Area models</li> </ul> </li> </ul>	
<b>Math Fact Fluency</b>		<p><b>Fluently</b> multiply and divide within 100</p> <ul style="list-style-type: none"> <li>• Use strategies based on properties of operations, and/or the relationship between multiplication and division</li> </ul> <p>Know from memory all products of two one-digit numbers by the end of 3rd grade</p>		<p><b>Fluently</b> multiply multi-digit whole numbers using the standard algorithm</p>	<p><b>Fluently</b> divide multi-digit numbers using the standard algorithm</p>