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# Frameworks for Mathematics

## *Kindergarten*



West Virginia DEPARTMENT OF  
EDUCATION



**West Virginia Board of Education  
2018-2019**

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## Kindergarten

Students in preschool and transitional kindergarten programs who have been exposed to important mathematical concepts—such as representing and comparing whole numbers, recognizing adding/removing objects as adding/subtracting, and identifying and describing shapes—will be better prepared for kindergarten mathematics and for later learning. In kindergarten, instructional time focuses on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; and (2) describing shapes and space. More learning time in kindergarten is devoted to developing and understanding of numbers and an understanding of addition and subtraction. Kindergarten students work toward fluency with addition and subtraction of whole numbers within 5.

### Counting and Cardinality

Standards	Teacher Understandings	Resources	Student Understandings
<p><b>Know number names and the count sequence.</b></p> <p>M.K.1 Count to 100 by ones and by tens.</p> <p>M.K.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).</p> <p>M.K.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).</p> <p><b>Count to tell the number of objects.</b></p> <p>M.K.4 Understand the relationship</p>	<p>It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades.</p> <p>Students use the <b>Mathematical Habits of Mind</b> to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards.</p> <p>A critical area of instruction in kindergarten is counting, representing, and comparing numbers. The student</p>	<p>The following is a list of resources for teachers and students:</p> <p><b>Math TREE Online Education Resources</b> A curated set of aligned, internet resources for WV elementary math teachers</p> <p><a href="#">Quantile Teacher Assistant</a> This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills</p>	<ul style="list-style-type: none"> <li>• Students are able to count to 100 by ones and tens counting forward beginning at a number other than one.</li> <li>• Students are able to count objects to 20 and write numerals to represent the objects.</li> <li>• Students count objects in various arrangements and understand that the last number said identifies the number of objects in the set.</li> <li>• Students compare numbers of objects using matching and counting strategies.</li> </ul>



<p>between numbers and quantities; connect counting to cardinality.</p> <p>a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.</p> <p>b. Understand that the last number name said tells the number of objects counted and the number of objects is the same regardless of their arrangement or the order in which they were counted.</p> <p>c. Understand that each successive number name refers to a quantity that is one larger.</p> <p>M.K.5 Count to answer questions (e.g., “How many?”) about as many as 20 things arranged in a line, a rectangular array, a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.</p> <p><b>Compare Numbers.</b></p> <p>M.K.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (e.g., by using matching and counting strategies).</p>	<p>understanding of these standards is developed throughout the entire year with mastery expected by the end of the school year.</p> <p>Student understanding of numbers provides the foundation for work with standards in the domains of Operation and Algebraic Thinking and Number and Operations in Base Ten.</p>	<p>most relevant to standards.</p> <p><b>Illustrative Mathematics</b> <a href="http://www.illustrativemathematics.org">http://www.illustrativemathematics.org</a> This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics, supporting the teacher’s content knowledge of mathematics.</p> <p><b>Graham Fletcher Site G Fletchy</b> <a href="http://www.gfletchy.com">http://www.gfletchy.com</a> This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics.</p> <p><b>Inside Mathematics</b></p>	<ul style="list-style-type: none"> <li>Students compare two numbers 0-10 that are written as numerals.</li> </ul> <p><b>Common Misconceptions</b></p> <ul style="list-style-type: none"> <li>Some students might not see zero (0) as a number. Avoid using the word none to represent this situation.</li> <li>Teen numbers can also be confusing for young students. To help avoid confusion, these numbers are should be taught as a bundle of 10 ones and some extra ones. The number names of the teen numbers do not reflect the structure of the written numerals. For example, fourteen has the ones spoken before the tens.</li> </ul>
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M.K.7 Compare two numbers between 1 and 10 presented as written numerals.

<http://insidemathematics.org>

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**NCTM Illuminations**

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**Math Coach's Corner**

**Donna Boucher**

<http://www.mathcoachcorner.com>

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## Operations and Algebraic Thinking

Standards	Teacher Understandings	Resources	Student Understandings
<p><b>Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.</b></p> <p>M.K.8 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), and acting out situations, verbal explanations, expressions, or equations.</p> <p>M.K.9 Solve addition and subtraction word problems and add and subtract within 10 by using objects or drawings to represent the problem.</p> <p>M.K.10 Decompose numbers less than or equal to 10 into pairs in more than one way by using objects or drawings, and record each decomposition by a drawing or equation (e.g., <math>5 = 2 + 3</math> and <math>5 = 4 +</math></p>	<p>It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades.</p> <p>Students use the <b>Mathematical Habits of Mind</b> to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards.</p> <p>The domain of <b>Operations and Algebraic Thinking</b> develops an understanding of addition as putting together and subtraction as taking apart or taking from. Students work with numbers within ten and they work toward fluency with these</p>	<p>The following is a list of resources for teachers and students:</p> <p><b>Math TREE Online Education Resources</b> A curated set of aligned, internet resources for WV elementary math teachers</p> <p><a href="#">Quantile Teacher Assistant</a> This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards.</p>	<ul style="list-style-type: none"> <li>• Students understand addition as putting together.</li> <li>• Students solve addition story problems with the result unknown.</li> <li>• Students solve addition story problems with both addends unknown.</li> <li>• Students understand subtraction as taking apart and taking from.</li> <li>• Students solve subtraction story problems with the result unknown.</li> <li>• Students can identify from 1 to 9 a number than makes 10.</li> <li>• Students develop fluency with addition and subtraction with numbers within 5. (This is an end of year</li> </ul>



<p>1).</p> <p>M.K.11 For any number from 1 to 9, find the number that makes 10 when added to the given number by using objects or drawings, and record the answer with a drawing or equation.</p> <p>M.K.12 Fluently add and subtract within 5.</p>	<p>operations for numbers within 5.</p> <p>The standards in domain of Operations and Algebraic Thinking directly connect to the standards in Counting and Cardinality. Students will use their understanding of number to develop an understanding of addition and subtraction.</p> <p>The equal sign (=) is related to the greater than symbol (&gt;) and less than symbol (&lt;) and shows a relationship between two quantities. The equal sign means that the two sides of the equation have the same value.</p>	<p><b>Illustrative Mathematics</b> <a href="http://www.illustrativemathematics.org">http://www.illustrativemathematics.org</a> This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics, supporting the teacher's content knowledge of mathematics.</p> <p><b>Graham Fletcher Site G Fletchy</b> <a href="http://www.gfletchy.com">http://www.gfletchy.com</a> This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics.</p> <p><b>Inside Mathematics</b> <a href="http://insidemathematics.org">http://insidemathematics.org</a></p>	<p>expectation. Fluency is developed with understanding as students compose and decompose numbers.)</p> <p><b>Common Misconceptions</b></p> <ul style="list-style-type: none"> <li>• The terms related to addition sound like synonyms that students commonly use in their everyday language. For instance, <i>some</i> means <i>part</i>; however, <i>sum</i> means <i>total</i>.</li> <li>• Young children may see the equal sign as “find an answer” instead of having the same value as.</li> </ul>
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## Number and Operations in Base Ten

Standards	Teacher Understandings	Resources	Student Understandings
<p><b>Work with numbers 11-19 to gain foundations for place value.</b></p> <p>M.K.13 Compose and decompose numbers from 11 to 19 into ten ones and some further ones by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., <math>18 = 10 + 8</math>); understand that these numbers are composed of ten ones (one ten) and one, two, three, four, five, six, seven, eight, or nine ones.</p>	<p>It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades.</p> <p>Students use the <b>Mathematical Habits of Mind</b> to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards.</p> <p>The <b>Number and Operations in Base Ten</b> domain lay the foundation for understanding the base-ten system. This understanding is essential as student move into later years of mathematics instruction.</p>	<p>The following is a list of resources for teachers and students:</p> <p><b>Math TREE Online Education Resources</b> A curated set of aligned, internet resources for WV elementary math teachers</p> <p><a href="#">Quantile Teacher Assistant</a> This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards.</p> <p><b>Illustrative Mathematics</b> <a href="http://www.illustrativemathematics.org">http://www.illustrativemathematics.org</a></p>	<ul style="list-style-type: none"> <li>Students develop an understanding of the teen numbers. They are composed of 10 ones (one ten) and some more ones.</li> </ul> <p><b>Common Misconceptions</b></p> <ul style="list-style-type: none"> <li>Teen numbers can be confusing for young students. To help avoid confusion, these numbers should be taught as a bundle of 10 ones and some extra ones. The number names of the teen numbers do not reflect the structure of the written numerals. For example, fourteen has the ones spoken before the tens.</li> </ul>



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		<p>the world. This site includes videos, learning tasks, and performance assessment tasks.</p> <p><b>NCTM Illuminations</b> <a href="https://illuminations.nctm.org/">https://illuminations.nctm.org/</a> Illuminations is a project designed by NCTM. The site includes lessons, activities, and computer applets.</p> <p><b>Math Coach's Corner</b> <b>Donna Boucher</b> <a href="http://www.mathcoachscorner.com">http://www.mathcoachscorner.com</a> This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts as well as mathematical tasks.</p>	
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## Measurement and Data

Standards	Teacher Understandings	Resources	Student Understandings
<p><b>Describe and compare measurable attributes.</b></p> <p>M.K.14 Describe measurable attributes of objects, such as length or weight and describe several measurable attributes of a single object.</p> <p>M.K.15 Directly compare two objects with a measurable attribute in common, to see which object has “more of” or “less of” the attribute, and describe the difference.</p> <p>M.K.16 Classify objects into given categories, count the numbers of objects in each category, and sort the categories by count. Category counts should be limited to less than or equal to 10. (e.g., Identify coins and sort them into groups of 5s or 10s.)</p>	<p>It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students’ skills and understandings. This will leave students unprepared for the challenges they face in later grades.</p> <p>Students use the <b>Mathematical Habits of Mind</b> to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards.</p> <p>The Measurement and Data domain focuses on measurable attributes, the direct comparing of two objects with a measurable attribute, and the classification of objects into categories by attribute.</p>	<p>The following is a list of resources for teachers and students:</p> <p><b>Math TREE Online Education Resources</b> A curated set of aligned, internet resources for WV elementary math teachers</p> <p><a href="#">Quantile Teacher Assistant</a> This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards.</p> <p><b>Illustrative Mathematics</b> <a href="http://www.illustrativemathematics.org">http://www.illustrativemathematics.org</a> This website provides teachers with</p>	<ul style="list-style-type: none"> <li>• Students are able to identify measurable attributes such as length and weight.</li> <li>• Students directly compare a measurable attribute of two objects and use the terms “more of” or “less of”.</li> <li>• Students classify objects into categories based on attributes.</li> </ul> <p><b>Common Misconceptions</b></p> <ul style="list-style-type: none"> <li>• Students may use smaller and bigger to describe measurable attributes. Students should be using words like taller/shorter, longer/shorter.</li> </ul>



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## Geometry

Standards	Teacher Understandings	Resources	Student Understandings
<p><b>Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).</b></p> <p>M.K.17 Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind and next to.</p> <p>M.K.18 Correctly name shapes regardless of their orientations or overall size.</p> <p>M.K.19 Through the use of real-life objects, identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").</p> <p><b>Analyze, compare, create and compose shapes.</b></p> <p>M.K.20 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe</p>	<p>It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades.</p> <p>Students use the <b>Mathematical Habits of Mind</b> to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards.</p> <p>The standards in the Geometry domain focus on describing and analyzing geometric shapes and using positional words to describe objects in their environment.</p>	<p>The following is a list of resources for teachers and students:</p> <p><b>Math TREE Online Education Resources</b> A curated set of aligned, internet resources for WV elementary math teachers</p> <p><a href="#">Quantile Teacher Assistant</a> This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards.</p> <p><b>Illustrative Mathematics</b> <a href="http://www.illustrativemathematics.org">http://www.illustrativemathematics.org</a> This website provides teachers with</p>	<ul style="list-style-type: none"> <li>Students describe objects in their environment using relative positions.</li> <li>Students are able to identify shapes and describe similarities and differences of shapes.</li> <li>Students compose simple shapes to form larger shapes. (pattern blocks and designs)</li> </ul> <p><b>Common Misconceptions</b></p> <ul style="list-style-type: none"> <li>Young children may attach meaning to the way a shape looks and is positioned or the color of the shape. For example, all triangles are green equilateral triangles. Students need to see shapes that are not regular and focus on the defining attributes of the shapes.</li> <li>A square with a vertex pointing downward is</li> </ul>



<p>their similarities, differences, parts (e.g., number of sides and vertices/“corners”), and other attributes (e.g., having sides of equal length). Instructional Note: Student focus should include real-world shapes.</p> <p>M.K.21 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.</p> <p>M.K.22 Compose simple shapes to form larger shapes (e.g., “Can these two triangles, with full sides touching, join to make a rectangle?”).</p>		<p>learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics, supporting the teacher’s content knowledge of mathematics.</p> <p><b>Graham Fletcher Site G Fletchy</b> <a href="http://www.gfletchy.com">http://www.gfletchy.com</a> This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics.</p> <p><b>Inside Mathematics</b> <a href="http://insidemathematics.org">http://insidemathematics.org</a> Inside Mathematics is a nationally recognized multimedia website for educators around the world. This site includes videos,</p>	<p>often referred to as a “diamond.” This needless introduction of a new shape name should be avoided, as it only serves to confuse the fact that such a shape is still a square, though its orientation is atypical.</p> <ul style="list-style-type: none"> <li>• Squares and rectangles are frequently referred to as two distinct shapes; however, squares are a subset of rectangles. A square is a rectangle where all sides have the same length. The defining attribute of a rectangle is that it is a parallelogram with (four) right angles.</li> </ul>
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