§126-44BB-1. General.

1.1. Scope. – W. Va. 126CSR42, West Virginia Board of Education Policy 2510, Assuring the Quality of Education: Regulations for Education Programs (hereinafter Policy 2510) provides a definition of a delivery system for, and an assessment and accountability system for, a thorough and efficient education for West Virginia public school students. Policy 2520.2B defines the content standards objectives for mathematics as required by Policy 2510.


1.3. Filing Date. – July 15, 2011.

1.4. Effective Date. – Kindergarten August 15, 2011; First Grade July 1, 2012; Second Grade July 1, 2013; Third through Twelfth July 1, 2014.

1.5. Repeal of former rule. – None. This is a new policy.

§126-44BB-2. Purpose.

2.1. This policy defines the content standards and objectives for the program of study required by Policy 2510 in mathematics.

§126-44BB-3. Incorporation by Reference.

3.1. A copy of the Next Generation Content Standards and Objectives for Mathematics in West Virginia Schools is attached and incorporated by reference into this policy. Copies may be obtained in the Office of the Secretary of State and in the West Virginia Department of Education, Office of Instruction.

§126-44BB-4. Summary of the Content Standards and Objectives.

4.1. The West Virginia Board of Education has the responsibility for establishing high quality standards pertaining to all educational standards pertaining to all education programs (W. Va. Code §18-9A-22). The content standards and objectives provide a focus for teachers to teach and students to learn those skills and competencies essential for future success in the workplace and further education. The document includes content standards for mathematics; an explanation of terms; objectives that reflect a rigorous and challenging curriculum; and performance descriptors.
Introduction

The Next Generation Content Standards and Objectives for Mathematics in West Virginia Schools are aligned to the Common Core State Standards for Mathematics, the culmination of an extended, broad-based effort to fulfill the charge issued by the states to create the next generation of K-12 standards in order to help ensure that all students are college and career ready no later than the end of high school. The Common Core State Standards for Mathematics, the product of work led by the Council of Chief State School Officers (CCSSO) and the National Governors Association (NGA), builds on the foundation laid by the states in their decades-long work on crafting high-quality education standards. In May 2010, the West Virginia Board of Education adopted the Common Core State Standards for Mathematics; shortly thereafter, 85 classroom teachers and representatives of Higher Education faculty began a deep study of this work and placed the content of these Standards into the West Virginia Framework. This group of West Virginia educators found the standards to be research and evidence-based, aligned with college and work expectations, rigorous, and internationally benchmarked. A particular standard was included in the document only when the best available evidence indicated that its mastery was essential for college and career readiness in a twenty-first-century, globally competitive society.

For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is “a mile wide and an inch deep.” These Standards are a substantial answer to that challenge. It is important to recognize that “fewer standards” are no substitute for focused standards. Achieving “fewer standards” would be easy to do by resorting to broad, general statements. Instead, these Standards aim for clarity and specificity. Assessing the coherence of a set of standards is more difficult than assessing their focus. William Schmidt and Richard Houang (2002) have said that content standards and curricula are coherent if they are articulated over time as a sequence of topics and performances that are logical and reflect, where appropriate, the sequential or hierarchical nature of the disciplinary content from which the subject matter derives. That is, what and how students are taught should reflect not only the topics that fall within a certain academic discipline, but also the key ideas that determine how knowledge is organized and generated within that discipline. This implies that to be coherent, a set of content standards must evolve from particulars (e.g., the meaning and operations of whole numbers, including simple math facts and routine computational procedures associated with whole numbers and fractions) to deeper structures inherent in the discipline. These deeper structures then serve as a means for connecting the particulars (such as an understanding of the rational number system and its properties). These Standards endeavor to follow such a design, not only by stressing conceptual understanding of key ideas, but also by continually returning to organizing principles such as place value or the properties of operations to structure those ideas.

The sequence of topics and performances that is outlined in a body of mathematics standards must also respect what is known about how students learn. In recognition of this, the development of these Standards began with research-based learning progressions detailing what is known today about how students’ mathematical knowledge, skill, and understanding develop over time. In the early grades there is greater focus and coherence. Mathematics experiences in early childhood settings should concentrate on (1) number, which includes whole number, operations, and relations, and (2) geometry, spatial relations, and measurement, with more mathematics learning time devoted to number than to other topics. Mathematical process goals should be integrated in these content areas.
Explanation of Terms

**Content Standards** are broad statements that define the knowledge, skills and understanding that all students must demonstrate in a content area at the end of the kindergarten through college career readiness sequence of study.

**Clusters** are groups of the objectives that define the expectations students must demonstrate to be college and career ready.

**Objectives** are incremental steps toward accomplishment of content standards. Objectives are listed by grade level and are organized around the clusters and content standards. Objectives build across grade levels as students advance in their knowledge and skills.

**Performance Descriptors** describe in narrative format how students demonstrate achievement of the content standards. Line breaks within the narrative format indicate clusters of concepts and skills. West Virginia has designed five performance levels: distinguished, above mastery, mastery, partial mastery, and novice. Performance Descriptors serve two functions. Instructionally, they give teachers more information about the level of knowledge and skills students need to acquire. Performance levels and descriptors are also used to categorize and explain student performance on statewide assessment instruments.

**Distinguished**: A student at this level has demonstrated exemplary performance. The work shows a distinctive and sophisticated application of knowledge and skills that go beyond course or grade level applications.

**Above Mastery**: A student at this level has demonstrated effective performance and exceeds the standard. The work shows a thorough and effective application of knowledge and skills.

**Mastery**: A student at this level has demonstrated adequate knowledge and skills that meet the standard. The work is accurate, complete and fulfills all requirements. The work shows solid academic performance at the course or grade level.

**Partial Mastery**: A student at this level has demonstrated limited knowledge and skills toward meeting the standard. The work shows basic but inconsistent application of knowledge and skills characterized by errors and/or omissions. Performance needs further development.

**Novice**: A student at this level has demonstrated minimal fundamental knowledge and skills needed to meet the standard. Performance at this level is fragmented and/or incomplete and needs considerable development.

**Numbering of Standards**
The number for each standard is composed of three parts, each part separated by a period:

- the content area code is M for Mathematics,
- the grade level, and
- the standard.

The Mathematics Standards are listed below:

CC  Counting and Cardinality
OA  Operations and Algebraic Thinking
NBT Number and Operations in Base Ten
G   Geometry
MD  Measurement and Data
NF  Number and Operations – Fractions
NS  The Number System
EE  Expressions and Equations
SP  Statistics and Probability
RP  Ratio and Proportional Relationships
F   Functions
RBQ Relationships Between Quantities
LER Linear and Exponential Relationships
RWE Reasoning with Equations
DST Descriptive Statistics
CPC Congruence, Proof and Constructions
CAG Connecting Algebra with Geometry through Coordinates
ENS Extending the Number System
QFM Quadratic Functions and Modeling
AOP Applications of Probability
STP Similarity, Right Triangles, and Trigonometry
C  Circles With and Without Coordinates
IC  Inferences and Conclusions from Data
PR  Polynomials, Radical Relationship
TF  Trigonometry of General Triangles and Trigonometric Functions
MM  Mathematical Modeling

Numbering of Objectives
The numbering of objectives is composed of four parts, each part separated by a period:
- the content area code is M for Mathematics,
- the grade level,
- the standard, and
- the objective.
Illustration: M.K.CC.4 refers to the fourth objective in the standard Counting and Cardinality.

Numbering of Performance Descriptors
The number for each group of four performance descriptors is composed of three parts, each part separated by a period:
• the content area (M for Mathematics),
• the letters PD are for Performance Descriptors,
• the grade level, and
• the standard number.

Illustration: M.PD.4.NBT refers to Mathematic performance descriptors for the fourth grade Number and Operations in Base Ten Standard.

**Unique Electronic Numbers (UENs)**

Unique Electronic Numbers (or UENs) are numbers that help to electronically identify, categorize and link, specific bits of information. Once Policy 2520.2B is available on the Web, each standard, each cluster, each objective and each group of five performance descriptors will have a Unique Electronic Number (UEN) that will always remain the same.

The codes printed in Policy 2520.2B form the basis of the UENs. The only additional set of numbers that will be added to each code to formulate its UEN will be a prefix that indicates the year and month that a particular version of Policy 2520.2B is approved by the State Board of Education.

The prefix for the UENs for each content area in Policy 2520.2B is noted at the top of each page containing standards, clusters, objectives and performance descriptors. As sections of Policy 2520.2B are revised, UENs will be changed to reflect the new approval date.

UENs (Unique Electronic Numbers) facilitate implementation of WV Standards into electronic formats such as databases and XML Files. The WV Department of Education encourages everyone who is going to use the Next Generation Content Standards for English Language Arts in any kind of electronic distribution, alignment, or software development to use the UENs so that all efforts can be cross-referenced and there is consistency across initiatives.
Mathematics – Policy 2520.2B

The West Virginia Next Generation Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student’s mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as \((a + b)(x + y)\) and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding \((a + b + c)(x + y)\). Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.

The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs. For example, for students with disabilities reading should allow for use of Braille, screen reader technology, or other assistive devices, while writing should include the use of a scribe, computer, or speech-to-text technology. In a similar vein, speaking and listening should be interpreted broadly to include sign language. No set of grade-specific standards can fully reflect the great variety in abilities, needs, learning rates, and achievement levels of students in any given classroom. However, the Standards do provide clear signposts along the way to the goal of college and career readiness for all students.

The Standards begin with eight Standards for Mathematical Practice.
Mathematics: Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report Adding It Up: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

MP1. Make sense of problems and persevere in solving them.
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables and graphs or draw diagrams of important features and relationships, graph data and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

MP2. Reason abstractly and quantitatively.
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize - to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand, considering the units involved, attending to the meaning of quantities, not just how to compute them, and knowing and flexibly using different properties of operations and objects.

MP3. Construct viable arguments and critique the reasoning of others.
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies.
Students at all grades can listen or read the arguments of others, decide whether they make sense and ask useful questions to clarify or improve the arguments.

**MP4. Model with mathematics.**
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

**MP5. Use appropriate tools strategically.**
Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

**MP6. Attend to precision.**
Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

**MP7. Look for and make use of structure.**
Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see $7 \times 8$ equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as $2 \times 7$ and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers $x$ and $y$. 

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MP8. Look for and express regularity in repeated reasoning.
Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation \((y - 2)/(x - 1) = 3\). Noticing the regularity in the way terms cancel when expanding \((x - 1)(x + 1)\), \((x - 1)(x^2 + x + 1)\) and \((x - 1)(x^3 + x^2 + x + 1)\) might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content

The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word “understand” are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential “points of intersection” between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development and student achievement in mathematics.
Mathematics – Kindergarten

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

1. Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 – 2 = 5$. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets or counting the number of objects that remain in a set after some are taken away.

2. Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

<table>
<thead>
<tr>
<th>Grade K</th>
<th>Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Counting and Cardinality</td>
</tr>
</tbody>
</table>

**Performance Descriptors**

<table>
<thead>
<tr>
<th>Distinguished</th>
<th>Above Mastery</th>
<th>Mastery</th>
<th>Partial Mastery</th>
<th>Novice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten students at the distinguished level in mathematics:</td>
<td>Kindergarten students at the above mastery level in mathematics:</td>
<td>Kindergarten students at the mastery level in mathematics:</td>
<td>Kindergarten students at the partial mastery level in mathematics:</td>
<td>Kindergarten students at the novice level in mathematics:</td>
</tr>
<tr>
<td>write and represent numbers beyond 100;</td>
<td>count beyond 100 by ones, twos, fives, and tens, and write and represent numbers beyond 20;</td>
<td>count to 100 by ones and tens, count forward from a given number, write and represent numbers 0 to 20 using concrete objects;</td>
<td>count to 29, read, write, and represent numbers to 19 using concrete objects;</td>
<td>count to 10, read, copy and represent some numbers with objects;</td>
</tr>
<tr>
<td>Cluster</td>
<td>Know Number Names and the Count Sequence</td>
<td></td>
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<tr>
<td>---------</td>
<td>----------------------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td>Students will</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.K.CC.1</td>
<td>count to 100 by ones and by tens.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.K.CC.2</td>
<td>count forward beginning from a given number within the known sequence (instead of having to begin at 1).</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>M.K.CC.3</td>
<td>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).</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Count to Tell the Number of Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>Students will</td>
</tr>
<tr>
<td>M.K.CC.4</td>
<td>understand the relationship between numbers and quantities; connect counting to cardinality</td>
</tr>
<tr>
<td>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,</td>
<td></td>
</tr>
<tr>
<td>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,</td>
<td></td>
</tr>
<tr>
<td>c. understand that each successive number name refers to a quantity that is one larger.</td>
<td></td>
</tr>
<tr>
<td>M.K.CC.5</td>
<td>count to answer “how many?” questions 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Compare Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>Students will</td>
</tr>
<tr>
<td>M.K.CC.6</td>
<td>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.</td>
</tr>
<tr>
<td>M.K.CC.7</td>
<td>compare two numbers between 1 and 10 presented as written numerals.</td>
</tr>
<tr>
<td>Grade K</td>
<td>Mathematics</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Standard</td>
<td>Operations and Algebraic Thinking</td>
</tr>
</tbody>
</table>

### Performance Descriptors: M.PD.K.OA

<table>
<thead>
<tr>
<th>Distinguished</th>
<th>Above Mastery</th>
<th>Mastery</th>
<th>Partial Mastery</th>
<th>Novice</th>
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<tr>
<td>Kindergarten students at the distinguished level in mathematics:</td>
<td>Kindergarten students at the above mastery level in mathematics:</td>
<td>Kindergarten students at the mastery level in mathematics:</td>
<td>Kindergarten students at the partial mastery level in mathematics:</td>
<td>Kindergarten students at the novice level in mathematics:</td>
</tr>
<tr>
<td>fluently add and subtract with and without representation and write equations to solve word problems.</td>
<td>represent addition and subtraction with and without symbols, create and solve word problems with and without objects or drawings, and write equations.</td>
<td>represent addition and subtraction within ten (fluently to five), solve word problems, and decompose numbers.</td>
<td>represent addition with objects, fingers, drawings, or role play, represent addition word problems using objects or drawings, and decompose numbers to 5.</td>
<td>represent “how many” with objects, drawings, or role play.</td>
</tr>
</tbody>
</table>

### Cluster
**Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Students will</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.K.OA.1</td>
<td>represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions or equations.</td>
</tr>
<tr>
<td>M.K.OA.2</td>
<td>solve addition and subtraction word problems and add and subtract within 10, e.g., by using objects or drawings to represent the problem.</td>
</tr>
<tr>
<td>M.K.OA.3</td>
<td>decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., (5 = 2 + 3) and (5 = 4 + 1)).</td>
</tr>
<tr>
<td>M.K.OA.4</td>
<td>for any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.</td>
</tr>
<tr>
<td>M.K.OA.5</td>
<td>fluently add and subtract within 5.</td>
</tr>
</tbody>
</table>

### Grade K Mathematics

<table>
<thead>
<tr>
<th>Standard</th>
<th>Number and Operation in Base Ten</th>
</tr>
</thead>
</table>

### Performance Descriptors: M.PD.K.NBT

<table>
<thead>
<tr>
<th>Distinguished</th>
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<th>Mastery</th>
<th>Partial Mastery</th>
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<td>Kindergarten students at the partial mastery level in mathematics:</td>
<td>Kindergarten students at the novice level in mathematics:</td>
</tr>
<tr>
<td>justify the decomposition of two-digit numbers.</td>
<td>compose and decompose two-digit numbers greater than 19.</td>
<td>compose and decompose numbers from 11 - 19 using place value with objects, drawings, or equations.</td>
<td>compose and decompose some numbers using place value and objects.</td>
<td>verbalize the counting sequence above ten and decompose numbers to ten with objects.</td>
</tr>
</tbody>
</table>
### Cluster: Work with Numbers 11-19 to Gain Foundation for Place Value

**Objectives**  
Students will compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation, e.g., \(18 = 10 + 8\); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

### Grade K  
Mathematics  
Standard Measurement and Data  
Performance Descriptors M.PD.K.MD

<table>
<thead>
<tr>
<th>Distinguished</th>
<th>Above Mastery</th>
<th>Mastery</th>
<th>Partial Mastery</th>
<th>Novice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten students at the distinguished level in mathematics: represent and design shapes using measurable attributes; justify the classification of objects and show representation.</td>
<td>Kindergarten students at the above mastery level in mathematics: organize shapes according to measurable attributes; classify and describe groups of objects.</td>
<td>Kindergarten students at the mastery level in mathematics: describe and compare measurable attributes using vocabulary such as more/less, taller/shorter, etc.; classify, count, and sort objects equal to or less than ten.</td>
<td>Kindergarten students at the partial mastery level in mathematics: recognize some measurable attributes; counts objects by given attributes.</td>
<td>Kindergarten students at the novice level in mathematics: match objects by a given attribute such as big/little, short/tall, etc.; sort objects into groups by a given attribute.</td>
</tr>
</tbody>
</table>

### Cluster: Describe and Compare Measurable Attributes

**Objectives**  
Students will describe measurable attributes of objects, such as length or weight and describe several measurable attributes of a single object.

**Objectives**  
Students will directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

### Cluster: Classify Objects and Count the Number of Objects in Each Category

**Objectives**  
Students will 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.

### Grade K  
Mathematics  
Standard Geometry  
Performance Descriptors M.PD.K.G

<table>
<thead>
<tr>
<th>Distinguished</th>
<th>Above Mastery</th>
<th>Mastery</th>
<th>Partial Mastery</th>
<th>Novice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten students at the distinguished level in</td>
<td>Kindergarten students at the above mastery level in</td>
<td>Kindergarten students at the mastery level in</td>
<td>Kindergarten students at the partial mastery level in</td>
<td>Kindergarten students at the novice level in mathematics:</td>
</tr>
</tbody>
</table>
Cluster | Identify and Describe Shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders and spheres)
--- | ---
Objectives | Students will
M.K.G.1 | 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.
M.K.G.2 | correctly name shapes regardless of their orientations or overall size.
M.K.G.3 | identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).

Cluster | Analyze, Compare, Create and Compose Shapes
--- | ---
Objectives | Students will
M.K.G.4 | analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/“corners”) and other attributes (e.g., having sides of equal length).
M.K.G.5 | model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
M.K.G.6 | compose simple shapes to form larger shapes. For example, “Can you join these two triangles with full sides touching to make a rectangle?”