Prekindergarten Mathematics

Maryland College and Career Ready Curriculum Framework

Introduction

The Code of Maryland Regulations (COMAR) 13A.04.12.01, Mathematics Instructional Programs for Grades Prekindergarten – 12 states that, "each local education agency shall provide in public schools an instructional program in mathematics each year for all students in grades prekindergarten – 8; Offer in public schools a mathematics program in grades 9—12. Beginning with students entering grade 9 in the 2014—2015 school year, each student shall enroll in a mathematics course in each year of high school that the student attends, up to a maximum of 4 years of attendance, unless in the 5th or 6th year a mathematics course is needed to meet a graduation requirement."

State Frameworks are developed by the Maryland State Department of Education (MSDE) to support local education agencies in providing high-quality instructional programs in mathematics. State Frameworks are defined as supporting documents and provide guidance for implementing the Maryland College and Career Ready Standards for Mathematics which are reviewed and adopted by the Maryland State Board of Education every eight years. State Frameworks also provide consistency in learning expectations for students in mathematics programs across the twenty-four local education agencies as local curriculum is developed and adopted using these documents as a foundation.

MSDE shall update the State Frameworks in Mathematics in the manner and time the State Superintendent of Schools determines is necessary to ensure alignment with best-in-class, research-based practices. Tenure and stability of State Frameworks affords local education agencies the necessary time to procure supporting instructional materials, provide professional development, and to measure student growth within the program. Educators, practitioners, and experts who participate in writing workgroups for State Frameworks represent the diversity of stakeholders across Maryland. State Frameworks in Elementary mathematics grades Prekindergarten – 5 were developed, reviewed, and revised by teams of Maryland educators and practitioners, including local education agency content curriculum specialists, classroom teachers, accessibility staff, and academic researchers and experts in close collaboration with MSDE.

The Prekindergarten Mathematics Framework was released in June 2011.

HOW TO READ THE MARYLAND COLLEGE AND CAREER READY CURRICULUM FRAMEWORK

The Maryland College and Career Ready Standards for Mathematics (MCCRSM) at the prekindergarten level specify the mathematics that all students should study as they prepare to be college and career ready by graduation. The prekindergarten standards are listed by domains. For further clarification of the standards, reference the appropriate domain in the set of Progression Documents for the Common Core State Standards for Mathematics.

This framework document provides an overview of the Standards that are grouped together to form the domains for grade one. The Standards within each domain are grouped by topic and are in the same order as they appear in the Common Core State Standards for Mathematics. This document is not intended to convey the exact order in which the Standards will be taught, nor the length of time to devote to the study of the different standards.

The framework contains the following:

- Domains are intended to convey coherent groupings of content.
- Clusters are groups of related standards.
- Standards define what students should understand and be able to do.
- Essential Skills and Knowledge statements provide language to help teachers develop common understandings and valuable insights into what a student must know and be able to do to demonstrate proficiency with each standard. Maryland mathematics educators thoroughly reviewed the standards and, as needed, provided statements to help teachers comprehend the full intent of each standard.

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).

1. 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.

2. 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.

3. 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 to improve the arguments.

4. 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.

5. 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.

6. 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.

7. 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 × 8 equals the well-remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 × 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.

8. 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 $(y – 2)/(x – 1)$ equals 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 MARYLAND COLLEGE AND CAREER READY STANDARDS

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.

PK.CC Counting and Cardinality

PK.CC.A KNOW NUMBER NAMES AND THE COUNT SEQUENCE.

PK.CC.A.1

Verbally count to 10 by ones and then develop rote counting to 20 by ones.

Essential Skills and Knowledge

- Ability to use rote counting to name number words in order (Stable Order Count: counting 1, 2, 3, 4 not 1, 3, 5).
- Begin rote counting 1–5 by ones.
- Build on rote counting 1–5 to rote counting 1–10.
- Build on rote counting 1–10 to begin to develop rote counting to 20.
- As students demonstrate proficiency with 1–10; then introduce 11–20.

PK.CC.A.2

Identify which number comes just after or just before a given number in the counting sequence to 10 with visual supports and manipulatives.

Essential Skills and Knowledge

- Ability to count forward beginning from a given number within the known sequence (Instead of having to begin at 1).
- Ability to name the number that comes just after a given number using visual supports such as dot cards or manipulatives. As students demonstrate proficiency remove the use of visual supports (dot cards) or manipulatives.
- Students are not expected to write numerals at this time.

PK.CC.A.3

Identify written numerals 0–10.

Essential Skills and Knowledge

- Students begin to recognize the difference between a letter and a numeral. Note: Some numerals are written in different text (4 with an open top or 9 with a curved line, etc.).
- Ability to recite the number names when pointing to numbers on a number line.
- Once students demonstrate proficiency with the various rote counting benchmarks, display a number line with the numerals for each sequence (1–5). As students rote count, the teacher points to the written numeral and says the name of the numeral so that students can begin to connect the number name to the symbol. Students repeat the number word names.
- Ability to connect the name of the numeral to the written symbol.

- Ability to identify the number word name for a numeral when seen in isolation.
- Ability to use numbers to describe of amounts when describing objects. e.g. instead of saying here are the dogs, say, here are three dogs.
- Students are not expected to write numerals at this time.

PK.CC.B COUNT TO TELL THE NUMBER OF OBJECTS.

PK.CC.B.4

Understand the relationship between numbers and quantities to 5, then to 10; connect counting to cardinality.

PK.CC.B.4a

When counting objects 1-10, say the number names in standard order, pairing each object with one and only one number name.

Essential Skills and Knowledge

- Ability to say the number names in standard order (Stable Order Count: counting 1, 2, 3, 4 not 1, 3, 5).
- Ability to count using one-to-one correspondence.
- Each object to be counted is assigned one and only one number name. Students use strategies such as touching objects or sliding objects, as they are counted and organizing the objects in a row or other means.
- Ability to keep track of the objects that have been counted and those that have not yet been counted.
- Note: Instruction should be scaffolded to move students towards counting objects independently i.e., count objects starting with 1- 5, then move to 1-10.

PK.CC.B.4b

Recognize that the last number name said, tells the number of objects counted. Recognize the count remains the same regardless of the order or arrangement of the objects.

Essential Skills and Knowledge

- Ability to use one-to-one correspondence when counting objects.
- Ability to keep track of objects counted while counting the total number in the set.
- Ability to recognize that the number of objects remains the same regardless of the arrangement or change in order.

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    - For example: If given a set of for buttons, (one red button, one yellow button, one blue button, one green button, a student can count the buttons using one-to-one correspondence counting the four buttons in any order- red, blue, green, yellow or yellow, red, green, blue, etc). Providing multiple experiences with counting helps students understand that the order in which a set of objects is counted, does not affect the amount in the group.
- Demonstrates awareness when recounting a group of objects. If the counting results in a different number, students demonstrate the ability to monitor their counting to ensure its accuracy e.g.: There is no teacher prompting to help the student recount for accuracy.

PK.CC.B.4c

Begin to recognize that each successive number name refers to a quantity that is one larger.

Essential Skills and Knowledge

- Ability to use concrete materials to model quantities increasing by one.

PK.CC.B.4d

Recognize the number of objects in a set without counting (subitizing) using 1–5 objects. Use 1–3 objects of irregular or unfamiliar patterns and 4 or 5 objects with familiar patterns.

Essential Skills and Knowledge

- Ability to look at familiar patterns of 1–3 objects (dots) then 1–5, to tell how many dots, and describe the arrangement of the objects (dots) without timing.
- Ability to look at familiar patterns of 1–3 objects (dots) then 1–5 and recreate the exact design while looking at the design using concrete materials. Compare the pattern (design made) to the one displayed. Tell how many total dots are in the pattern and describe the arrangement.
- Ability to look at a displayed familiar pattern of 1–3 objects (dots) then 1–5 and recreate the exact design from memory using concrete materials. Compare the pattern (design made) to the one displayed. Tell how many are in the pattern.

- Ability to look at a displayed familiar pattern of 1–3 objects (dots) then 1–5 and recreate the exact design without looking using concrete materials. Begin to gradually decrease the time the pattern is displayed. Compare the pattern (design made) to the one displayed. Tell how many are in the pattern.
- Continue with familiar patterns 1–3 until students demonstrate proficiency to be able to identify a given amount without counting. Then introduce unfamiliar and different patterns with 1–3 objects (dots). Repeat with 1–5 objects (dots).
- Students are not expected to write the numerals for this standard.

PK.CC.B.5
Represent a number by producing sets of objects with concrete materials, pictures, and or numerals. *(First 0-5 and then to10*) Can correctly respond when asked "how many" after counting concrete objects.

Essential Skills and Knowledge

- Ability to correctly pair and name the numeral with the correct amount of concrete objects.
    - Example: Students use number cards (numbers 1-5, then 1-10.) with the numeral and matching number of dots to indicate the quantity of the numeral. Students then place a concrete object (such as multi-link cube or counter on each dot to show the number of objects for the given numeral). Students should be able to say the name of the numeral.

      3
      x
      x x

- Ability to identify a written numeral and create sets of objects to represent the quantity using concrete materials or pictures (first 0-5 and then to 10). Student understands the amount of objects in the set (quantity) is represented by the numeral.
    - Students need multiple experiences with a variety of objects to count, to foster the development of this skill throughout the year.
- Ability to answer “how many” after counting the objects in a set (beginning cardinality understanding). Students are able to monitor their own and someone else’s counting for accuracy and provide the correct response to the “how many” question.
- Ability to use numbers to describe the number of objects counted e.g., instead of saying here are the dogs, say, here are three dogs.
- Ability to “count out” a given quantity.

PK.CC.C COMPARE QUANTITIES.

PK.CC.C.6
Compare groups of objects up to 5 and then to 10. 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 *(includes groups with up to 5 objects).*

Essential Skills and Knowledge

- Ability to compare sets (objects need to be the same size and color) visually by matching or counting the sets using one-to-one correspondence.
- Knowledge of the terms “greater than/more than,” “less than,” and “equal to/same as” through experiences with comparing groups of objects e.g., “There are more red blocks than green blocks.
- Ability to correctly use the terms “greater than/more than,” “less than,” “fewer than,” and “equal to/same as ” e.g., “There are more red blocks than green because there are 5 boys and 2 girls”.

PK.OA Operations and Algebraic Thinking

Note: Proficiency in Operations and Algebraic Thinking standards should not be expected until students have a thorough understanding of all Counting and Cardinality standards (especially quantity). These standards should be taught through the use of finger plays, poetry, literature, songs, role-playing activities.

PK.OA.A UNDERSTAND ADDITION AS PUTTING TOGETHER AND ADDING TO, AND UNDERSTAND SUBTRACTION AS TAKING APART AND TAKING FROM.

PK.OA.A.1

Represent simple addition and subtraction problems with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, or verbal explanations, up to 5.

Essential Skills and Knowledge

- Ability to physically act out and then use actual, physical objects to represent the problem e.g., dinosaur toys to represent dinosaur problems, stickers represent stickers, fingers represent fingers.
- Ability to use “math manipulatives” to represent the objects e.g., multi-link cubes may represent foods, two colored counters may represent animals, to represent a problem.
- Ability to use pictures either drawn by teacher and/or by student to represent the problem. Student drawings need not show details but should show a representation of the problem.
- Students are not expected to write equations in pre-kindergarten but should see equations written by the teacher after they have become proficient representing the problem by acting out or using concrete materials.

PK.OA.A.2

Decompose a quantity, less than or equal to 5, then to 10, into pairs in more than one way, e.g.by using objects or drawings.

Essential Skills and Knowledge

- Ability to decompose quantities, less than or equal to 5, into pairs in multiple ways using a variety of math manipulatives such as multilink cubes, fives frames, dot cards and counters, etc.
- Ability to record the results of decomposing quantities, less than or equal to 5 using five frames or drawings.
- Ability to decompose quantities, less than or equal to 10, into pairs in multiple ways using a variety of math manipulatives such as two colors of multilink cubes, two-color counters, fives frames, or dot cards etc.
- Ability to record the results of decomposing quantities, less than or equal to 10, using ten frames or drawings.

PK.OA.A.3

For any quantity 1-5, use objects or drawings to find the quantity that must be added to make 5.

Essential Skills and Knowledge

- Ability to use manipulatives to find the amount needed to complete the set.
- Ability to use Five Frames and counters to model solutions.
- Ability to record the solutions using pictures or simple drawings. Precut shapes of the manipulatives may be used to represent the solutions.

PK.MD Measurement and Data

PK.MD.ADESCRIBE AND COMPARE MEASUREABLE ATTRIBUTES.

PK.MD.A.1

Describe measurable attributes of objects, such as length or weight.

Essential Skills and Knowledge

- Ability to identify a measurable attribute for an object (i.e. related to length or weight).
- Ability to use vocabulary specific to measurable attributes of objects, such as, big, large, small, long, short, light, heavy, tall, and short.

PK.MD.A.2

Directly compare two objects with a measurable attribute in common, using words such as "bigger/smaller," "longer/shorter," "lighter/heavier," or "taller/shorter." Order up to 3 objects by a measurable attribute (e.g. biggest to smallest).

Note: Physical objects need to be compared. Students should not look at pictures to tell which is heavier/lighter, bigger/smaller, etc.

Essential Skills and Knowledge

- Ability to physically align two concrete objects to determine which is longer, shorter, or if they are the same length (horizontal).
- Ability to physically align two concrete objects to determine which is taller, shorter, or if they are the same height (vertical).
- Ability to compare the weight of two concrete objects to determine which is heavier, lighter, or if they are the same weight.
- Ability to order up to 3 objects by height or length (e.g., biggest to smallest, shortest to tallest).
- Ability to align two concrete objects to determine which is longer/shorter/same length, then determine the placement of the third object based on the length of the first two objects. The three objects are arranged from shortest to longest.
- Ability to hold two concrete objects to determine which is heaviest to lightest, then determine the placement of the third object based on the weight of the first two objects.

PK.MD.BSORT OBJECTS INTO CATEGORIES AND COMPARE QUANTITIES.

PK.MD.B.3

Sort objects into given categories and self-selected categories. Identify the attribute by which the objects were sorted (Limit category counts to less than 5).

Essential Skills and Knowledge

- Ability to recognize that objects have a variety of characteristics or attributes (i.e., an object may be blue, round, large).
- Ability to recognize a given attribute in a group of objects.
- Ability to recognize when an object does not have the given attribute (circle vs not a circle).
- Ability to place objects in a group based on a given attribute.
- Ability to self-select and sort physical objects into their own categories. Student may or may not be able to state the attribute used for sorting.

- Ability to sort a group of objects by and explain how they sorted.
- By the end of the year, students need to be given the attribute and then sort the objects.

PK.MD.B.4

Compare categories using words such as greater than/more, less than, and equal to/same (Limit category counts to less than 5).

Essential Skills and Knowledge

- Ability to sort objects into categories and then describe the categories using comparative language (e.g., There are more bus riders than car riders; or there are the same number of large and small bears.)
- Ability to compare quantities of categories visually or by aligning the items one to one, not by the numeric comparison.
- Knowledge of and ability to apply appropriate comparison vocabulary of ‘more’ or ‘same’.

PK.G Geometry

PK.G.A IDENTIFY AND DESCRIBE TWO DIMENSIONAL SHAPES (CIRCLES, TRIANGLES, RECTANGLES, INCLUDING A SQUARE WHICH IS A SPECIAL RECTANGLE)

PK.G.A.1

Match like two-dimensional shapes and correctly name the shapes regardless of their orientations or overall size.

Essential Skills and Knowledge

- Ability to match two-dimensional shapes that are the same shape and size.
- Ability to identify the shapes circle, triangle, rectangle, and square by name.
- Ability to match triangles, circles, rectangles, and squares in a variety of orientations or different sizes.
- Ability to describe two-dimensional shapes (circles, triangles, rectangles, and squares) by the number of sides and corners.
- Understand that a square is a special rectangle.

PK.G.A.2

Group the shapes by like attributes and distinguish between examples and non-examples of various two-dimensional shapes.

Essential Skills and Knowledge

- Ability to sort two-dimensional shapes into groups based on the attribute of shape, (by round/curved or straight sides) using examples and non-examples.
- Ability to describe their groupings by the attributes used (curved or straight lines) or by the names of the shapes.
- Ability to distinguish examples and non-examples of the basic shapes.

PK.G.B WORK WITH THREE- DIMENSIONAL SHAPES TO GAIN FOUNDATIONS FOR GEOMETRIC THINKING

PK.G.B.3

Match and sort three-dimensional shapes.

Note: This standard should be taught using the wooden blocks and concrete manipulatives. Students should have multiple experiences with free play using these materials to explore three-dimensional shapes. Students are not expected to name these shapes in the early stages of working with the shapes. Frequently, during these beginning stages of working with three-dimensional shapes, students will use real world names for the shapes such as ice cube for cube or ball for sphere. Teachers should introduce the correct mathematical names for the three-dimensional shapes as students work with the shapes.

Essential Skills and Knowledge

- Ability to identify and describe the likeness and differences in three dimensional shapes.
- Identify and compare three-dimensional figures by sorting and describing sides as flat or curved.
- Match like three- dimensional shapes.
- Use age-appropriate language to tell how two three-dimensional shapes are alike or different.
- Sort three-dimensional shapes into groups to show an attribute of likeness.

PK.G.B.4

Use real world examples to describe three-dimensional objects using correct mathematical vocabulary (cube, sphere, and cylinder).

Essential Skills and Knowledge

- Begin to recognize two dimensional shapes within a three-dimensional shape (i.e., one side of a cube looks like a square).
- Ability to describe three-dimensional objects using vocabulary such as shape, corners, edges, and/or similarities to other shapes (i.e., a cube has six sides, and each side looks like a square).

PK.G.B.5

Compose and describe structures using three-dimensional shapes. Descriptions may include shape attributes, relative position, etc.

Essential Skills and Knowledge

- Ability to build structures using manipulatives and blocks.
- Ability to describe their structures including shapes, sizes, comparisons, positional relationships, etc.

Prekindergarten MD College and Career-Ready Vocabulary

ROTE COUNTING

Reciting numbers in order from memory without aligning them to objects, pictures, etc.

CARDINALITY

Is the understanding that when counting a set, the last number represents the total number of objects in the set.

ONE-TO-ONE CORRESPONDENCE

Linking a single number name with one object--and only one--at a time.

SUBITIZING

The ability to recognize the total number of objects or shapes in a set without counting. Example: Recognizing that this face of a cube has five dots without counting them.

REPRESENT

Display addition or subtraction processes using concrete materials, pictures, numbers, words, or acting it out.

DECOMPOSE NUMBERS

Breaking a number into two or more parts to make it easier with which to work.
Example: When combining a set of 5 and a set of 8, a student might decompose 8 into a set of 3 and a set of 5, making it easier to see that the two sets of 5 make 10 and then there are 3 more for a total of 13.
Decompose the number 4; can be made up of 1+3; 3+1; 2+2