**Grade 2**

**Math CAP**

**Grade 2 - Common Core Math Curriculum**

 **UNPACKING THE MODULES**

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**2013/2014**

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**Abstract**

**Grade 2**

**Second Grade Mathematics Common Core**

**2013-2014**

This CAP was developed to align the modules provided by New York State to the math curriculum. These new curriculum modules in mathematics are developed with an in-depth focus on fewer topics. Our goal is to integrate the Common Core Learning Standards, rigorous classroom reasoning, extended classroom time devoted to practice and reflection through extensive problem sets, and high expectations for mastery. Completion of a curriculum module will depend on the scope and difficulty of the mathematical content that is the focus of the module. Due to a greater focus on mathematical understanding in the classroom, it is beneficial to align and implement these modules with the present curriculum. The Common Core mathematical shifts that impact the NYS assessments are used to develop a more focused and in-depth understanding of the mathematical concepts. These six shifts include; focus, coherence, fluency, deep understanding, application and dual intensity. The curriculum, instruction and assessment are a reflection of the focus and emphasis of these standards through the use of the modules.

Additionally, this CAP includes a teacher friendly pacing calendar that integrates the New York State Modules and Shifts to the present curriculum.

**Rationale**

**Grade 2**

**Second Grade Mathematics Common Core**

**2013-2014**

 The Mathematics Common Core Learning Standards emphasize the six mathematical shifts. These shifts are needed to effectively implement the Common Core Learning Standards. The first shift, focus, stresses that teachers significantly narrow and deepen the scope of how time and energy is spent in the math classroom in order to focus deeply on the concepts. Coherence, shift 2, carefully connects the learning within and across grades so that students will build a new understanding onto foundations built in previous years. Fluency, shift 3, students will develop speed and accuracy with simple calculations. Shift 4, a deep understanding, students will develop a deeper understanding of the math concept instead of relying on tricks to get the answer correct. Application, shift 5, students apply math in real world situations, solving problems that occur in their daily lives. The final shift, dual intensity, has student practicing and understanding the concepts with intensity.

 Our purpose is to provide a concise curriculum calendar integrating the New York State Modules to be used as a guide to drive instructional decisions regarding time and other resources with varying degrees of emphasis on the six shifts. These modules focus on the six shifts in the curriculum and the integration of these modules into our daily teaching is essential so that students will meet and exceed the Common Core Learning Standards in order to be college and career ready.

Emphases in Common Core Standards for Mathematical Content

Kindergarten – Grade 8

March 12, 2012

Content Emphases by Cluster

Describes content emphases in the standards at the cluster level for each grade. These are provided

because curriculum, instruction and assessment at each grade must reflect the focus and emphasis of

the standards.

Not all of the content in a given grade is emphasized equally in the standards. The list of content

standards for each grade is not a flat, one‐dimensional checklist; this is by design. There are sometimes

strong differences of emphasis even within a single domain. Some clusters require greater emphasis

than the others based on the depth of the ideas, the time that they take to master, and/or their

importance to future mathematics or the demands of college and career readiness. In addition, an

intense focus on the most critical material at each grade allows depth in learning, which is carried out

through the Standards for Mathematical Practice. Without such focus, attention to the practices would

be difficult and unrealistic, as would best practices like formative assessment.

Therefore, to make relative emphases in the standards more transparent and useful, the NY Math

Emphases designate clusters as Major, Additional and Supporting for the grade in question.

To say that some things have greater emphasis is not to say that anything in the standards can safely be

neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may

leave students unprepared for the challenges of a later grade. The assessments will mirror the message

that is communicated here: Major Clusters will be a majority of the assessment, Supporting Clusters will

be assessed through their success at supporting the Major Clusters and Additional Clusters will be

assessed as well. The assessments will strongly focus where the standards strongly focus.

In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are

given in each grade for ways to connect the Supporting Clusters to the Major Clusters of the grade. Thus,

rather than suggesting even inadvertently that some material not be taught, there is direct advice for

teaching it in ways that foster greater focus and coherence.

Finally, the following are some recommendations for using the cluster‐level emphases:

**Do …**

• Use the guidance to inform instructional decisions regarding time and other resources spent on

clusters of varying degrees of emphasis.

• Allow the focus on the major work of the grade to open up the time and space to bring the Standards

for Mathematical Practice to life in mathematics instruction through sense‐making, reasoning,

arguing and critiquing, modeling, etc.

• Evaluate instructional materials taking the cluster‐level emphases into account. The major work of the grade must be presented with the highest possible quality; the supporting work of the grade should indeed support the major focus, not detract from it.

• Set priorities for other implementation efforts taking the emphases into account, such as staff

development; new curriculum development; or revision of existing formative or summative testing at the state, district or school level.

**Don’t …**

• Neglect any material in the standards. (Instead, use the information provided to connect Supporting Clusters to the other work of the grade.)

• Sort clusters from Major to Supporting, and then teach them in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.

• Use the cluster headings as a replacement for the standards. All features of the standards matter — from the practices to surrounding text to the particular wording of individual content standards. Guidance is given at the cluster level as a way to talk about the content with the necessary specificity yet without going so far into detail as to compromise the coherence of the standards.

**Explanations of terms used:**

**Major Clusters** – areas of intensive focus, where students need fluent

understanding and application of the core concepts (approximately 70%).

**Supporting Clusters** – rethinking and linking; areas where some material is being covered, but in a way that applies core understandings(approximately 20%).

**Additional Clusters** – expose students to other subjects, though at a distinct, level of depth and intensity (approximately 10%).

**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).

**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 or 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 + 9*x* + 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) = 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.

**Grade 2 Overview**

**2.OA Operations and Algebraic Thinking**

* **2 Represent and solve problems involving addition and subtraction.**
	+ **2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.**

#### 2 Add and subtract within 20.

#### 2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

#### 2 Work with equal groups of objects to gain foundations for multiplication.

#### 2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

### 2.NBT Number and Operations in Base Ten

#### 2 Understand place value.

#### 2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

#### 2.NBT.1.a 100 can be thought of as a bundle of ten tens - called a "hundred."

#### 2.NBT.1.b The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

#### 2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.

#### 2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

#### 2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

#### 2 Use place value understanding and properties of operations to add and subtract.

#### 2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

#### 2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

#### 2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

#### 2.NBT.8 Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.

#### 2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.

### 2.MD Measurement and Data

#### 2 Measure and estimate lengths in standard units.

#### 2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

#### 2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

#### 2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.

#### 2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

#### 2 Relate addition and subtraction to length.

#### 2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

#### 2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2,..., and represent whole-number sums and differences within 100 on a number line diagram.

#### 2 Work with time and money.

#### 2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

#### 2.MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.

#### 2 Represent and interpret data.

#### 2.MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

#### 2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

### 2.G Geometry

#### 2 Reason with shapes and their attributes.

#### 2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

#### 2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

#### 2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.