2011 K-5 Mathematics Specifications for the 2012-2013 Florida State Adoption of Instructional Materials

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Florida Department of Education
Office of Instructional Materials
(850) 245-0425
Web Address: http://www.fldoe.org/bii/instruct_mat/

Florida's Vision for Grades K-5 Mathematics Education

The Florida Department of Education's mission is to increase the proficiency of all students within one seamless, efficient system, by providing them with the opportunity to expand their knowledge and skills through learning opportunities and research valued by students, parents, and communities, and to maintain an accountability system that measures student progress toward the following goals:

- Highest student achievement
- Seamless articulation and maximum access
- Skilled workforce and economic development
- Quality efficient services

The Florida Department of Education is committed to changing the culture of our schools from PreK to postsecondary by raising the ceiling and raising the floor to better enable our students for success in the 21st century. Part of our Education Strategic Plan to carry out this vision includes strengthening foundation skills which will be strategically carried out by the Implementation of the Common Core State Standards.[1]

The Common Core State Standards (CCSS) in Mathematics were adopted by the Florida State Board of Education on July 27, 2010. In the summer of 2010, the Florida Department of Education convened a state committee to determine if additional content (up to 15 percent) was needed to satisfy mathematics requirements in Florida. Based on the results of this study, in the fall of 2010, the Department recommended no additions be made to the original Common Core State Standards adopted in July 2010.

These standards define what students should know and be able to do in their study of mathematics. 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. The student who can explain the rule understands the mathematics and may have a better chance to succeed at a less familiar task. Mathematical understanding and procedural skill are equally important and both are assessable using mathematical tasks of sufficient richness.[2]

Key Points in Mathematics of the Common Core include the following:[3]

- The K-5 standards provide students with a *solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions and decimals*—which help young students build the foundation to successfully apply more demanding math concepts and procedures, and move into applications.
- In Kindergarten, the standards follow successful international models and recommendations from the National Research Council's Early Math Panel report, by focusing kindergarten work on the

[1] FLDOE, http://www.fldoe.org/Strategic_Plan/

[2] The Common Core State Standards of Mathematics, http://www.corestandards.org/assets/CCSSI_Math Standards.pdf, page 4

[3] http://www.corestandards.org/about-the-standards/key-points-in-mathematics

number core: learning how numbers correspond to quantities, and learning how to put numbers together and take them apart (the beginnings of addition and subtraction).

- The K-5 standards build on the best state standards to provide detailed guidance to teachers on how to navigate their way through challenging topics such as *fractions, negative numbers, and geometry*, and do so by maintaining a continuous progression from grade to grade.
- The standards stress not only procedural skill but also conceptual understanding, to make sure students are learning and absorbing the critical information they need to succeed at higher levels - rather than the current practices by which many students learn enough to get by on the next test, but forget it shortly thereafter, only to review again the following year.
- Having built a strong foundation K-5, students can do hands on learning in geometry, algebra, and probability and statistics.

Curriculum developed using these standards should reflect their rigor and their structure. Keys to the success of this include connecting the content standards to the standards for mathematical practice at each level.

> *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.*[4]

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.[5]

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 to deeper structures inherent in the discipline. These deeper structures then serve as a means for connecting the particulars.*[6]

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[4] The Common Core State Standards for Mathematics, http://www.corestandards.org/assets/CCSSI_Math Standards.pdf, page 8

[5] The Common Core State Standards for Mathematics, http://www.corestandards.org/assets/CCSSI_Math Standards.pdf, page 3

[6] The Common Core State Standards for Mathematics, http://www.corestandards.org/assets/CCSSI_Math Standards.pdf, page 3 and 4

Many aspects of the central elements of the CCSS echo the longstanding positions and principles of many national mathematics organizations like the National Council of Teachers of Mathematics, Association of State Supervisors of Mathematics, National Council of Supervisors of Mathematics, and the Association of Mathematics Teacher Educators. These include the following:[7]

- All students need to develop mathematical practices such as solving problems, making connections, understanding multiple representations of mathematical ideas, communicating their thought processes, and justifying their reasoning.
- All students need both conceptual and procedural knowledge related to a mathematical topic, and they need to understand how the two types of knowledge are connected.
- Curriculum documents should organize learning expectations in ways that reflect research on how children learn mathematics.
- All students need opportunities for reasoning and sense making across the mathematics curriculum—and they need to believe that mathematics is sensible, worthwhile, and doable.

Chapter 2 of the *Principles and Standards for School Mathematics* (NCTM, 2000), is entitled "Principles for School Mathematics." Six principles are identified (page 11) as follows:

- Equity: Excellence in mathematics education requires equity-high expectations and strong support for all students.
- Curriculum: A curriculum is more than a collection of activities; it must be coherent, focused on important mathematics, and well articulated across the grades.
- Teaching: Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.
- Learning: Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.
- Assessment: Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.
- Technology: Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.

Curriculum should not be driven by instructional materials. However, quality instructional materials should integrate these same principles and can be enormously helpful to students, teachers, parents, and administrators. Effective instructional materials help students learn mathematics. They also help teachers provide instruction and continue to learn more about teaching. Instructional materials should contain an array of assessment approaches, including formative assessment tasks, to provide feedback about learning and teaching, and incorporate technology into the teaching and learning.

[7] Common Core State Standards Joint Statement, http://www.nctm.org/standards/content.aspx?id=26088

Publisher Submissions for Florida's 2012 Mathematics Adoption

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Florida will accept for consideration mathematics instructional materials configured as follows:

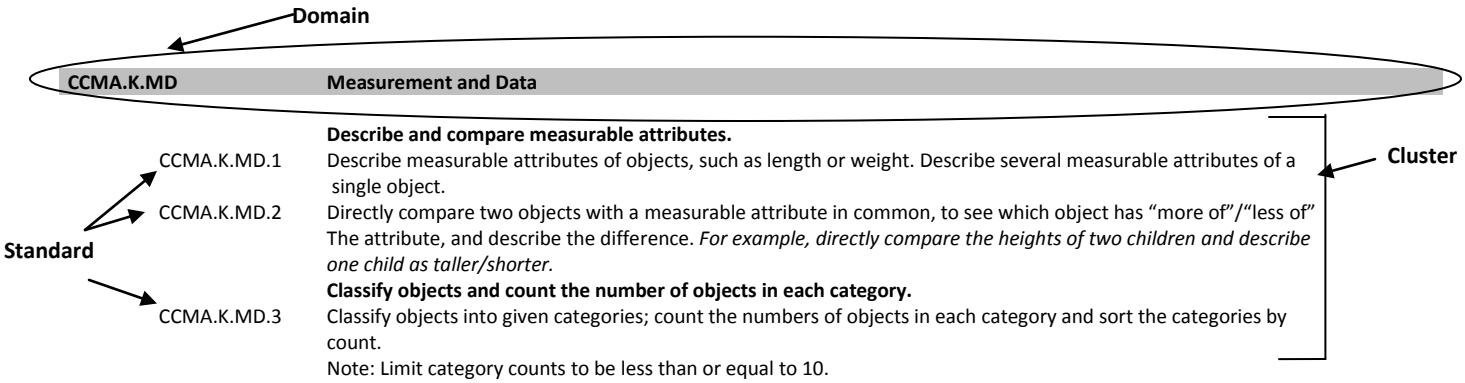
Elementary Mathematics Series, K-5

How to Read the Grade Level Standards[8]

Standards define what students should understand and be able to do.

Clusters are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.

Domains are larger groups of related standards. Standards from different domains may sometimes be closely related.



These Standards do not dictate curriculum or teaching methods. For example, just because topic A appears before topic B in the standards for a given grade, it does not necessarily mean that topic A must be taught before topic B. A teacher might prefer to teach topic B before topic A, or might choose to highlight connections by teaching topic A and topic B at the same time. Or, a teacher might prefer to teach a topic of his or her own choosing that leads, as a byproduct, to students reaching the standards for topics A and B.

What students can learn at any particular grade level depends upon what they have learned before. Ideally then, each standard in this document might have been phrased in the form, "Students who already know…should next come to learn…" But at present this approach is unrealistic – not least because existing education research cannot specify all such learning pathways. Therefore, of necessity, grade placements for specific topics have been made on the basis of state and international comparisons and the collective experience and collective professional judgment of educators, researchers, and mathematicians. One promise of common state standards is that over time they will allow research on learning progressions to inform and improve the design of standards to a much greater extent than is possible today. Learning opportunities will continue to vary across schools and school systems and educators should make every effort to meet the needs of individual students based on their current understanding.

These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.

[8] The Common Core State Standards for Mathematics, http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf, page 5

General Description for Publishers' Submissions

GENERAL INFORMATION

Course Number: 5012020

Course Path: **Section:** Grades PreK to 12 Education Courses » **Grade Group:** Grades PreK to 5 Education Courses » **Subject:** Mathematics » **SubSubject:** General Mathematics »

Course Title: Mathematics - Grade Kindergarten

Course Section: Grades PreK to 12 Education Courses

Abbreviated Title: Mathematics - Grade Kindergarten

Number of Credits: NA

Course Length: Year

Course Type: Core

Course Level: NA

Course Status: SBE Approval Pending

MACC.K ***In Kindergarten, instructional time should focus on two critical areas: (1) representing, relating, and operating on 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).

RELATED BENCHMARKS:

Scheme	Descriptor
MACC.K12.MP	***Mathematical Practices***
MACC.K12.MP.1	***Make sense of problems and persevere in solving them***
MACC.K12.MP.2	***Reason abstractly and quantitatively***
MACC.K12.MP.3	***Construct viable arguments and critique the reasoning of others***
MACC.K12.MP.4	***Model with mathematics***
MACC.K12.MP.5	***Use appropriate tools strategically***
MACC.K12.MP.6	***Attend to precision***
MACC.K12.MP.7	***Look for and make use of structure***
MACC.K12.MP.8	***Look for and express regularity in repeated reasoning***

MACC.K.CC	Counting and Cardinality
MACC.K.CC.1	**Know number names and the count sequence.**
MACC.K.CC.1.1	Count to 100 by ones and by tens.
MACC.K.CC.1.2	Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
MACC.K.CC.1.3	Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
MACC.K.CC.2	**Count to tell the number of objects.**
MACC.K.CC.2.4	Understand the relationship between numbers and quantities; connect counting to cardinality.
MACC.K.CC.2.4a	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.
MACC.K.CC.2.4b	Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
MACC.K.CC.2.4c	Understand that each successive number name refers to a quantity that is one larger.
MACC.K.CC.2.5	Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.
MACC.K.CC.3	**Compare numbers.**
MACC.K.CC.3.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. Note: Include groups with up to ten objects.
MACC.K.CC.3.7	Compare two numbers between 1 and 10 presented as written numerals.

MACC.K.OA	Operations and Algebraic Thinking
MACC.K.OA.1	**Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.**
MACC.K.OA.1.1	Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. Note: Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)
MACC.K.OA.1.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
MACC.K.OA.1.3	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).
MACC.K.OA.1.4	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.
MACC.K.OA.1.5	Fluently add and subtract within 5.

MACC.K.NBT	Number and Operations in Base Ten
MACC.K.NBT.1	**Work with numbers 11–19 to gain foundations for place value.**
MACC.K.NBT.1.1	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.

MACC.K.MD	Measurement and Data
MACC.K.MD.1	**Describe and compare measurable attributes.**
MACC.K.MD.1.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
MACC.K.MD.1.2	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.*
MACC.K.MD.2	**Classify objects and count the number of objects in each category.**
MACC.K.MD.2.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. Note: Limit category counts to be less than or equal to 10.

MACC.K.G	Geometry
MACC.K.G.1	**Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).**
MACC.K.G.1.1	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*.
MACC.K.G.1.2	Correctly name shapes regardless of their orientations or overall size.
MACC.K.G.1.3	Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
MACC.K.G.2	**Analyze, compare, create, and compose shapes.**
MACC.K.G.2.4	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).
MACC.K.G.2.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
MACC.K.G.2.6	Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

GENERAL INFORMATION

Course Number: 5012030

Course Path: **Section:** Grades PreK to 12 Education Courses » **Grade Group:** Grades PreK to 5 Education Courses » **Subject:** Mathematics » **SubSubject:** General Mathematics »

Course Title: Mathematics - Grade One

Course Section: Grades PreK to 12 Education Courses

Abbreviated Title: Mathematics - Grade One

Number of Credits: NA

Course Length: Year

Course Type: Core

Course Level: NA

Course Status: SBE Approval Pending

MACC.1 ***In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.***

(1) Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-

together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., "making tens") to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.

(2) Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

(3) Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement. Note: Students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term.

(4) Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

RELATED BENCHMARKS:

Scheme	Descriptor
MACC.K12.MP	***Mathematical Practices***
MACC.K12.MP.1	***Make sense of problems and persevere in solving them***
MACC.K12.MP.2	***Reason abstractly and quantitatively***
MACC.K12.MP.3	***Construct viable arguments and critique the reasoning of others***
MACC.K12.MP.4	***Model with mathematics***
MACC.K12.MP.5	***Use appropriate tools strategically***
MACC.K12.MP.6	***Attend to precision***
MACC.K12.MP.7	***Look for and make use of structure***
MACC.K12.MP.8	***Look for and express regularity in repeated reasoning***
MACC.1.OA	**Operations and Algebraic Thinking**
MACC.1.OA.1	**Represent and solve problems involving addition and subtraction.**
MACC.1.OA.1.1	Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. Note: See Table 1.
MACC.1.OA.1.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

MACC.1.OA.2	**Understand and apply properties of operations and the relationship between addition and subtraction.**
MACC.1.OA.2.3	Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.) Note: Students need not use formal terms for these properties.*
MACC.1.OA.2.4	Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.*
MACC.1.OA.3	**Add and subtract within 20.**
MACC.1.OA.3.5	Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
MACC.1.OA.3.6	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
MACC.1.OA.4	**Work with addition and subtraction equations.**
MACC.1.OA.4.7	Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*
MACC.1.OA.4.8	Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □.*

MACC.1.NBT	**Number and Operations in Base Ten**
MACC.1.NBT.1	**Extend the counting sequence.**
MACC.1.NBT.1.1	Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
MACC.1.NBT.2	**Understand place value.**
MACC.1.NBT.2.2	Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
MACC.1.NBT.2.2a	10 can be thought of as a bundle of ten ones — called a “ten.”
MACC.1.NBT.2.2b	The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
MACC.1.NBT.2.2c	The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
MACC.1.NBT.2.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
MACC.1.NBT.3	**Use place value understanding and properties of operations to add and subtract.**
MACC.1.NBT.3.4	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
MACC.1.NBT.3.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

MACC.1.NBT.3.6	Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.
MACC.1.MD	**Measurement and Data**
MACC.1.MD.1	**Measure lengths indirectly and by iterating length units.**
MACC.1.MD.1.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.
MACC.1.MD.1.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*
MACC.1.MD.2	**Tell and write time.**
MACC.1.MD.2.3	Tell and write time in hours and half-hours using analog and digital clocks.
MACC.1.MD.3	**Represent and interpret data.**
MACC.1.MD.3.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
MACC.1.G	**Geometry**
MACC.1.G.1	**Reason with shapes and their attributes.**
MACC.1.G.1.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MACC.1.G.1.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. Note: Students do not need to learn formal names such as "right rectangular prism."
MACC.1.G.1.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Table 1*

	Result Unknown	Change Unknown	Start Unknown
Add To	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5
Take From	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 – ? = 3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? – 2 = 3
	Total Unknown	Addend Unknown	Both Addends Unknown[1]
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ?	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare[3]	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 – 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = ?, ? + 3 = 5

* Florida Department of Education, adapted from the Common Core State Standards for Mathematics.

1-These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.

2-Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for numbers less than or equal to 10.

3-For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

GENERAL INFORMATION

Course Number:	5012040
Course Path:	**Section:** Grades PreK to 12 Education Courses » **Grade Group:** Grades PreK to 5 Education Courses » **Subject:** Mathematics » **SubSubject:** General Mathematics »
Course Title:	Mathematics - Grade Two
Course Section:	Grades PreK to 12 Education Courses
Abbreviated Title:	Mathematics - Grade Two
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending
MACC.2	***In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.*** *(1) Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).* *(2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.* *(3) Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.* *(4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.*

RELATED BENCHMARKS:

Scheme	Descriptor
MACC.K12.MP	***Mathematical Practices***
MACC.K12.MP.1	***Make sense of problems and persevere in solving them***
MACC.K12.MP.2	***Reason abstractly and quantitatively***
MACC.K12.MP.3	***Construct viable arguments and critique the reasoning of others***
MACC.K12.MP.4	***Model with mathematics***
MACC.K12.MP.5	***Use appropriate tools strategically***
MACC.K12.MP.6	***Attend to precision***

MACC.K12.MP.7	***Look for and make use of structure***
MACC.K12.MP.8	***Look for and express regularity in repeated reasoning***

MACC.2.OA	**Operations and Algebraic Thinking**
MACC.2.OA.1	**Represent and solve problems involving addition and subtraction.**
MACC.2.OA.1.1	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. Note: See Table 2.
MACC.2.OA.2	**Add and subtract within 20.**
MACC.2.OA.2.2	Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers. Note: See standard MACC.1.OA.3.6 for a list of mental strategies.
MACC.2.OA.3	**Work with equal groups of objects to gain foundations for multiplication.**
MACC.2.OA.3.3	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.
MACC.2.OA.3.4	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

MACC.2.NBT	**Number and Operations in Base Ten**
MACC.2.NBT.1	**Understand place value.**
MACC.2.NBT.1.1	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:
MACC.2.NBT.1.1a	100 can be thought of as a bundle of ten tens — called a "hundred."
MACC.2.NBT.1.1b	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).
MACC.2.NBT.1.2	Count within 1000; skip-count by 5s, 10s, and 100s.
MACC.2.NBT.1.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
MACC.2.NBT.1.4	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
MACC.2.NBT.2	**Use place value understanding and properties of operations to add and subtract.**
MACC.2.NBT.2.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
MACC.2.NBT.2.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.
MACC.2.NBT.2.7	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.
MACC.2.NBT.2.8	Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
MACC.2.NBT.2.9	Explain why addition and subtraction strategies work, using place value and the properties of operations. Note: Explanations may be supported by drawings or objects.

MACC.2.MD	Measurement and Data
MACC.2.MD.1	**Measure and estimate lengths in standard units.**
MACC.2.MD.1.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
MACC.2.MD.1.2	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.
MACC.2.MD.1.3	Estimate lengths using units of inches, feet, centimeters, and meters.
MACC.2.MD.1.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
MACC.2.MD.2	**Relate addition and subtraction to length.**
MACC.2.MD.2.5	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.
MACC.2.MD.2.6	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.
MACC.2.MD.3	**Work with time and money.**
MACC.2.MD.3.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
MACC.2.MD.3.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. *Example: If you have 2 dimes and 3 pennies, how many cents do you have?*
MACC.2.MD.4	**Represent and interpret data.**
MACC.2.MD.4.9	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.
MACC.2.MD.4.10	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.

MACC.2.G	Geometry
MACC.2.G.1	**Reason with shapes and their attributes.**
MACC.2.G.1.1	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. Note: Sizes are compared directly or visually, not compared by measuring.
MACC.2.G.1.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
MACC.2.G.1.3	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.

Table 2*

	Result Unknown	Change Unknown	Start Unknown
Add To	Twenty-two bunnies sat on the grass. Thirty-five more bunnies hopped there. How many bunnies are on the grass now? 22 + 35 = ?	Twenty-two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were fifty-seven bunnies. How many bunnies hopped over to the first twenty-two? 22 + ? = 57	Some bunnies were sitting on the grass. Thirty-five more bunnies hopped there. Then there were fifty-seven bunnies. How many bunnies were on the grass before? ? + 35 = 57
Take From	Fifty-seven apples were on the table. Twenty-two apples were eaten. How many apples are on the table now? 57 – 22 = ?	Fifty-seven apples were on the table. Some apples were eaten. Then there were thirty-five apples. How many apples were eaten? 57 – ? = 35	Some apples were on the table. Twenty-two apples were eaten. Then there were thirty-five apples. How many apples were on the table before? ? – 22 = 35
	Total Unknown	Addend Unknown	Both Addends Unknown[1]
Put Together/ Take Apart[2]	Thirty-five red apples and twenty-two green apples are on the table. How many apples are on the table? 35 + 22 = ?	Fifty-seven apples are on the table. Thirty-five are red and the rest are green. How many apples are green? 35 + ? = 57, 57 – 35 = ?	Grandma has fifty-seven flowers. How many can she put in her red vase and how many in her blue vase? 57 = 0 + 57, 57 = 57 + 0 57 = 11 + 46, 57 = 46 + 11 57 = 22 + 35, 57 = 35 + 22, etc.
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare[3]	("How many more?" version): Lucy has twenty-two apples. Julie has fifty-seven apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has twenty-two apples. Julie has fifty-seven apples. How many fewer apples does Lucy have than Julie? 22 + ? = 57, 57 – 22 = ?	(Version with "more"): Julie has thirty-five more apples than Lucy. Lucy has twenty-two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 35 fewer apples than Julie. Lucy has twenty-two apples. How many apples does Julie have? 22 + 35 = ?, 35 + 22 = ?	(Version with "more"): Julie has thirty-five more apples than Lucy. Julie has fifty-seven apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 35 fewer apples than Julie. Julie has fifty-seven apples. How many apples does Lucy have? 57 – 35 = ?, ? + 35 = 57

*Florida Department of Education adapted from the Common Core State Standards for Mathematics.

1-These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.

2-Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for numbers less than or equal to 10.

3-For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

GENERAL INFORMATION

Course Number: 5012050

Course Path: **Section**: Grades PreK to 12 Education Courses » **Grade Group**: Grades PreK to 5 Education Courses » **Subject**: Mathematics » **SubSubject**: General Mathematics »

Course Title: Mathematics - Grade Three

Course Section: Grades PreK to 12 Education Courses

Abbreviated Title: Mathematics - Grade Three

Number of Credits: NA

Course Length: Year

Course Type: Core

Course Level: NA

Course Status: SBE Approval Pending

MACC.3 ***In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.***

(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

(2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

(3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

(4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

RELATED BENCHMARKS:

Scheme	Descriptor
MACC.K12.MP	***Mathematical Practices***
MACC.K12.MP.1	***Make sense of problems and persevere in solving them***
MACC.K12.MP.2	***Reason abstractly and quantitatively***
MACC.K12.MP.3	***Construct viable arguments and critique the reasoning of others***
MACC.K12.MP.4	***Model with mathematics***
MACC.K12.MP.5	***Use appropriate tools strategically***
MACC.K12.MP.6	***Attend to precision***
MACC.K12.MP.7	***Look for and make use of structure***
MACC.K12.MP.8	***Look for and express regularity in repeated reasoning***

MACC.3.OA	**Operations and Algebraic Thinking**
MACC.3.OA.1	**Represent and solve problems involving multiplication and division.**
MACC.3.OA.1.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*
MACC.3.OA.1.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*
MACC.3.OA.1.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. Note: See Table 3.
MACC.3.OA.1.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = □ ÷ 3, 6 × 6 = ?.*
MACC.3.OA.2	**Understand properties of multiplication and the relationship between multiplication and division.**
MACC.3.OA.2.5	Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) Note: Students need not use formal terms for these properties.*
MACC.3.OA.2.6	Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*
MACC.3.OA.3	**Multiply and divide within 100.**
MACC.3.OA.3.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
MACC.3.OA.4	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.**
MACC.3.OA.4.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. Note: This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

MACC.3.OA.4.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

MACC.3.NBT	**Number and Operations in Base Ten**
MACC.3.NBT.1	**Use place value understanding and properties of operations to perform multi-digit arithmetic. Note: A range of algorithms may be used.**
MACC.3.NBT.1.1	Use place value understanding to round whole numbers to the nearest 10 or 100.
MACC.3.NBT.1.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
MACC.3.NBT.1.3	Multiply one-digit whole numbers by multiples of 10 in the range 10 – 90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

MACC.3.NF	**Number and Operations—Fractions**
	Note: Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
MACC.3.NF.1	**Develop understanding of fractions as numbers.**
MACC.3.NF.1.1	Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.
MACC.3.NF.1.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram.
MACC.3.NF.1.2a	Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
MACC.3.NF.1.2b	Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.
MACC.3.NF.1.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
MACC.3.NF.1.3a	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
MACC.3.NF.1.3b	Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
MACC.3.NF.1.3c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
MACC.3.NF.1.3d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

MACC.3.MD	**Measurement and Data**
MACC.3.MD.1	**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**
MACC.3.MD.1.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
MACC.3.MD.1.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Note: Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word

	problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Note: Excludes multiplicative comparison problems (problems involving notions of "times as much." Note: See Table 3.
MACC.3.MD.2	**Represent and interpret data.**
MACC.3.MD.2.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*
MACC.3.MD.2.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units — whole numbers, halves, or quarters.
MACC.3.MD.3	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**
MACC.3.MD.3.5	Recognize area as an attribute of plane figures and understand concepts of area measurement.
MACC.3.MD.3.5a	A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
MACC.3.MD.3.5b	A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
MACC.3.MD.3.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
MACC.3.MD.3.7	Relate area to the operations of multiplication and addition.
MACC.3.MD.3.7a	Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
MACC.3.MD.3.7b	Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
MACC.3.MD.3.7c	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
MACC.3.MD.3.7d	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
MACC.3.MD.4	**Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**
MACC.3.MD.4.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
MACC.3.G	**Geometry**
MACC.3.G.1	**Reason with shapes and their attributes.**
MACC.3.G.1.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
MACC.3.G.1.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

Table 3*

Common Multiplication and Division Situations

Note: The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.

	Unknown Product	Group Size Unknown ("How many in each group?" Division)	Number of Groups Unknown ("How many groups?" Division)
	3 × 6 = ?	3 × ? = 18, and 18 ÷ 3 = ?	? × 6 = 18, and 18 ÷ 6 = ?
Equal groups	There are 3 bags with 6 plums in each bag. How many plums are there in all? *Measurement example*. You need 3 lengths of string, each 6 inches long. How much string will you need altogether?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? *Measurement example*. You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? *Measurement example*. You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
Arrays,[4] Area[5]	There are 3 rows of apples with 6 apples in each row. How many apples are there? *Area example*. What is the area of a 3 cm by 6 cm rectangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? *Area example*. A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? *Area example*. A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?
Compare	A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? *Measurement example*. A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? *Measurement example*. A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue hat? *Measurement example*. A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
General	a x b = ?	a x ? = p, and p ÷ a = ?	? x b = p, and p ÷ b = ?

*Florida Department of Education, adapted from the Common Core State Standards for Mathematics.

4-The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

5-Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

GENERAL INFORMATION

Course Number: 5012060

Course Path: **Section:** Grades PreK to 12 Education Courses » **Grade Group:** Grades PreK to 5 Education Courses » **Subject:** Mathematics » **SubSubject:** General Mathematics »

Course Title: Mathematics - Grade Four

Course Section: Grades PreK to 12 Education Courses

Abbreviated Title: Mathematics - Grade Four

Number of Credits: NA

Course Length: Year

Course Type: Core

Course Level: NA

Course Status: SBE Approval Pending

MACC.4 ***In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.***

(1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

(2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

(3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

RELATED BENCHMARKS:

Scheme	Descriptor
MACC.K12.MP	***Mathematical Practices***
MACC.K12.MP.1	***Make sense of problems and persevere in solving them***
MACC.K12.MP.2	***Reason abstractly and quantitatively***
MACC.K12.MP.3	***Construct viable arguments and critique the reasoning of others***

MACC.K12.MP.4	***Model with mathematics***
MACC.K12.MP.5	***Use appropriate tools strategically***
MACC.K12.MP.6	***Attend to precision***
MACC.K12.MP.7	***Look for and make use of structure***
MACC.K12.MP.8	***Look for and express regularity in repeated reasoning***

MACC.4.OA	**Operations and Algebraic Thinking**
MACC.4.OA.1	**Use the four operations with whole numbers to solve problems.**
MACC.4.OA.1.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
MACC.4.OA.1.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
MACC.4.OA.1.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MACC.4.OA.2	**Gain familiarity with factors and multiples.**
MACC.4.OA.2.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.
MACC.4.OA.3	**Generate and analyze patterns.**
MACC.4.OA.3.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

MACC.4.NBT	**Numbers and Operations in Base Ten**
	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.
MACC.4.NBT.1	**Generalize place value understanding for multi-digit whole numbers.**
MACC.4.NBT.1.1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*
MACC.4.NBT.1.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
MACC.4.NBT.1.3	Use place value understanding to round multi-digit whole numbers to any place.
MACC.4.NBT.2	**Use place value understanding and properties of operations to perform multi-digit arithmetic.**
MACC.4.NBT.2.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
MACC.4.NBT.2.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

MACC.4.NBT.2.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
MACC.4.NF	**Numbers and Operations - Fractions**
	Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
MACC.4.NF.1	**Extend understanding of fraction equivalence and ordering.**
MACC.4.NF.1.1	Explain why a fraction *a/b* is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
MACC.4.NF.1.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
MACC.4.NF.2	**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**
MACC.4.NF.2.3	Understand a fraction *a/b* with $a > 1$ as a sum of fractions $1/b$.
MACC.4.NF.2.3a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
MACC.4.NF.2.3b	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*
MACC.4.NF.2.3c	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
MACC.4.NF.2.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
MACC.4.NF.2.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
MACC.4.NF.2.4a	Understand a fraction *a/b* as a multiple of $1/b$. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*
MACC.4.NF.2.4b	Understand a multiple of *a/b* as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
MACC.4.NF.2.4c	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*
MACC.4.NF.3	**Understand decimal notation for fractions, and compare decimal fractions.**
MACC.4.NF.3.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100 and add 3/10 + 4/100 = 34/100.* Note: Students who can

	generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.
MACC.4.NF.3.6	Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*
MACC.4.NF.3.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

MACC.4.MD	**Measurement and Data**
MACC.4.MD.1	**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**
MACC.4.MD.1 .1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example: Know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), …*
MACC.4.MD.1.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
MACC.4.MD.1.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*
MACC.4.MD.2	**Represent and interpret data.**
MACC.4.MD.2.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*
MACC.4.MD.3	**Geometric measurement: understand concepts of angle and measure angles.**
MACC.4.MD.3.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
MACC.4.MD.3.5a	An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.
MACC.4.MD.3.5b	An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.
MACC.4.MD.3.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
MACC.4.MD.3.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

MACC.4.G	Geometry
MACC.4.G.1	**Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**
MACC.4.G.1.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
MACC.4.G.1.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
MACC.4.G.1.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

GENERAL INFORMATION

Course Number:	5012070
Course Path:	**Section:** Grades PreK to 12 Education Courses » **Grade Group:** Grades PreK to 5 Education Courses » **Subject:** Mathematics » **SubSubject:** General Mathematics »
Course Title:	Mathematics - Grade Five
Course Section:	Grades PreK to 12 Education Courses
Abbreviated Title:	Mathematics - Grade Five
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending
MACC.5	***In Grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.*** *(1) Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)* *(2) Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.*

(3) Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.

RELATED BENCHMARKS:

Scheme	Descriptor
MACC.K12.MP	***Mathematical Practices***
MACC.K12.MP.1	***Make sense of problems and persevere in solving them***
MACC.K12.MP.2	***Reason abstractly and quantitatively***
MACC.K12.MP.3	***Construct viable arguments and critique the reasoning of others***
MACC.K12.MP.4	***Model with mathematics***
MACC.K12.MP.5	***Use appropriate tools strategically***
MACC.K12.MP.6	***Attend to precision***
MACC.K12.MP.7	***Look for and make use of structure***
MACC.K12.MP.8	***Look for and express regularity in repeated reasoning***
MACC.5.OA	**Operations and Algebraic Thinking**
MACC.5.OA.1	**Write and interpret numerical expressions.**
MACC.5.OA.1.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
MACC.5.OA.1.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*
MACC.5.OA.2	**Analyze patterns and relationships.**
MACC.5.OA.2.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*
MACC.5.NBT	**Numbers and Operations in Base Ten**
MACC.5.NBT.1	**Understand the place value system.**
MACC.5.NBT.1.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
MACC.5.NBT.1.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10.
MACC.5.NBT.1.3	Read, write, and compare decimals to thousandths.
MACC.5.NBT.1.3a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).

MACC.5.NBT.1.3b	Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
MACC.5.NBT.1.4	Use place value understanding to round decimals to any place.
MACC.5.NBT.2	**Perform operations with multi-digit whole numbers and with decimals to hundredths.**
MACC.5.NBT.2.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
MACC.5.NBT.2.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
MACC.5.NBT.2.7	Add, subtract, multiply, and divide decimals to hundredths, 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 and explain the reasoning used.
MACC.5.NF	**Numbers and Operations - Fractions**
MACC.5.NF.1	**Use equivalent fractions as a strategy to add and subtract fractions.**
MACC.5.NF.1.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*
MACC.5.NF.1.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7 by observing that 3/7 < 1/2.*
MACC.5.NF.2	**Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**
MACC.5.NF.2.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3 and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50 pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
MACC.5.NF.2.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
MACC.5.NF.2.4a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*
MACC.5.NF.2.4b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
MACC.5.NF.2.5	Interpret multiplication as scaling (resizing) by:
MACC.5.NF.2.5a	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
MACC.5.NF.2.5b	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1

	as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a) / (n \times b)$ to the effect of multiplying a/b by 1.
MACC.5.NF.2.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
MACC.5.NF.2.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.
MACC.5.NF.2.7a	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4 and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*
MACC.5.NF.2.7b	Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5) and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*
MACC.5.NF.2.7c	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3 cup servings are in 2 cups of raisins?*
MACC.5.MD	**Measurement and Data**
MACC.5.MD.1	**Convert like measurement units within a given measurement system.**
MACC.5.MD.1.1	Convert among different-sized standard measurement units within a given measurement system, e.g., convert 5 cm to 0.05 m, and use these conversions in solving multi-step, real world problems.
MACC.5.MD.2	**Represent and interpret data.**
MACC.5.MD.2.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*
MACC.5.MD.3	**Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.**
MACC.5.MD.3.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
MACC.5.MD.3.3a	A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
MACC.5.MD.3.3b	A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.
MACC.5.MD.3.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
MACC.5.MD.3.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
MACC.5.MD.3.5a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent

	threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
MACC.5.MD.3.5b	Apply the formulas *V = l x w x h* and *V = b x h* for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
MACC.5.MD.3.5c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

MACC.5.G	**Geometry**
MACC.5.G.1	**Graph points on the coordinate plane to solve real-world and mathematical problems.**
MACC.5.G.1.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).
MACC.5.G.1.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
MACC.5.G.2	**Classify two-dimensional figures into categories based on their properties.**
MACC.5.G.2.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
MACC.5.G.2.4	Classify two-dimensional figures in a hierarchy based on properties.

Major Priorities for Instructional Materials

Content, Presentation, Learning

The priorities as described in this specification document were developed from research findings about what makes instructional materials effective. These priorities have undergone review by individuals who have served on state and district committees, by curriculum specialists, by instructional designers, by evaluation specialists, and by administrators of the statewide adoption system.

Instructional materials must be effective in three major priority areas: content, presentation, and learning. The following sections describe essential features for each of these priority areas. These features generally apply to all formats of instructional materials, whether print or other media/multiple media formats.

Content

Some features of content coverage have received progressively more attention over the past decade. These features include:

A. ALIGNMENT WITH CURRICULUM REQUIREMENTS
B. LEVEL OF TREATMENT OF CONTENT
C. EXPERTISE FOR CONTENT DEVELOPMENT
D. ACCURACY OF CONTENT
E. CURRENTNESS OF CONTENT
F. AUTHENTICITY OF CONTENT
G. MULTICULTURAL REPRESENTATION
H. HUMANITY AND COMPASSION

The following sections describe the content features expected for each of these priority areas.

A. ALIGNMENT WITH CURRICULUM REQUIREMENTS

Content must align with the state's standards for the subject, grade level, and learning outcomes. See Sections 1006.34(2)(b); 1006.38(3)(b); 1006.31(2), Florida Statutes.

Correlations: Publishers are expected to provide correlation reports in the provided form to show exactly where and to what extent (mentioned or in-depth) the instructional materials cover each required Common Core State Standards and/or Course Descriptions for **Mathematics.**

Scope: The content should address Florida's required curriculum standards for the subject, grade level, and learning outcomes, including thinking and learning skills.

Completeness: The content of the major tool should be complete enough to stand on its own. To be useful for classroom instruction, instructional materials must be adaptable to the instructional goals and course outlines for individual school districts, as well as the state standards. Content should have no major omissions in the required content coverage and be free of unrelated facts and information that would detract from achievement of Florida's specified Common Core State Standards in Mathematics.

B. LEVEL OF TREATMENT OF CONTENT

The level of complexity or difficulty of content must be appropriate for the standards, student abilities and grade level, and time periods allowed for teaching. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

Objectives: Content should be simple, complex, technical, or nontechnical enough for the intended objectives.

Students: Content should be developmentally appropriate for the age and maturity level of the intended students. It should contain sufficient details for students to understand the significance of the information presented and to engage in reflection and discussion.

Time: The level of complexity or difficulty of content also should allow for its coverage during the time periods available for teaching the subject.

C. EXPERTISE FOR CONTENT DEVELOPMENT

Expertise in the content area and in education of the intended students must be reflected in the authors, reviewers, and sources that contributed to the development of the materials. See Section 1006.38(14), Florida Statutes.

Authorship: The authors, consultants, and reviewers must have actually contributed to the development of the instructional materials and should have credentials that reflect expertise in the subject area, course, course category, grade level, pedagogy, education, teaching, or classroom instruction. Qualifications may include expertise in educational psychology or instructional design.

Sources: Primary and secondary sources should reflect expert information for the subject, such as relevant data from research journals, and other recognized scientific sources. The type of sources considered appropriate will vary with the particular subject area.

In the subject area of MATHEMATICS, expertise is expected to include authors commonly accepted in the field of mathematics education research, curriculum development, assessment, and staff development.

D. ACCURACY OF CONTENT

Content must be accurate in historical context and contemporary facts and concepts. See Sections 1006.38(8); 1006.31(2)(e); 1006.35, Florida Statutes.

Objectivity: Content that is included in the materials should accurately represent the domain of knowledge and events. It should be factual and objective. It should be free of mistakes, errors, inconsistencies, contradictions within itself, and biases of interpretation. It should be free of the biased

selection of information. Materials should distinguish between facts and possible interpretations or opinions expressed about factual information. Visuals or other elements of instruction should contribute to the accuracy of text or narrative.

Representativeness: The selection of content should not misrepresent the domain of knowledge and events. It should include the generally accepted and prevalent theories, major concepts, laws, standards, and models used within the discipline of the subject area.

Correctness: Presentation of content should be free of typographical and visual errors. It should include correct grammar, spelling, linguistics, terminology, definitions, descriptions, visuals, graphs, sounds, videos, and all other components of the instructional materials.

For the subject area of MATHEMATICS, publishers must submit materials that connect mathematics with a variety of subject areas. Regardless of the particular topic, the information presented must be accurate in historical context and contemporary facts and concepts.

E. CURRENTNESS OF CONTENT

Content must be up-to-date for the academic discipline and the context in which the content is presented. See Sections 1006.38(8); 1006.31(2)(e), Florida Statutes.

Dates or editions: Copyright dates for photographs and other materials and editions should suggest sufficient currentness of content. Copyright dates and editions serve as indicators about currentness. However, neither the copyright date nor the edition guarantees currentness. Subsequent editions should reflect more up-to-date information than earlier editions.

Informed examination of the text, narrative, and visuals contained in the materials provides the most direct information about currentness of the materials.

Context. Text or narrative, visuals, photographs, and other features should reflect the time periods appropriate for the objectives and the intended learners.

- Sometimes context should be current. For example, a photograph used to show stages of human growth and development will be more relevant when the clothing, hairstyles, and activities reflect present-day styles.
- Sometimes context should be historical. For example, illustrations and photographs of historical events should reflect the historical time period.
- Sometimes context should be both current and historical. For example, historic images alongside modern ones would convey changes in styles over time.
- At all times the context should be relevant to the learner, to the Curriculum Frameworks, and to the concept presented.

F. AUTHENTICITY OF CONTENT

Content should include problem-centered connections to life in a context that is meaningful to students. See Sections 1006.31(2)(e); 1006.34(2)(b); 1003.42, Florida Statutes.

Life connections: Instructional materials should include connections to the student's life situations in order to make the content meaningful. Students might be expected to deal with time constraints, consider risks and trade-offs in decision-making, and work with teams. Connections may be made to situations of daily home life, careers, vocation, community events and services, and leisure or recreation.

Interdisciplinary treatment: Instructional materials also should include interdisciplinary connections in order to make content meaningful. Examples of situations that connect a variety of subject areas include building projects, playing sports, retrieving information or objects, balancing budgets, creating products, and researching information. In addition to subject area connections, instructional materials should connect the course or course category to other disciplines. Examples of approaches to interdisciplinary connections include: explanations and activities for using skills and knowledge from other academic disciplines; assignments that require students to relate learning from other disciplines rather than to isolate knowledge or skills; the focus on common themes across several subject areas (infusion, parallel, transdisciplinary, or multidisciplinary instruction).

In the subject area of MATHEMATICS, publishers must integrate materials to all appropriate content areas and should refer to Common Core State Standards for the content areas.

G. MULTICULTURAL REPRESENTATION

Portrayal of gender, ethnicity, age, work situations, and various social groups must include multicultural fairness and advocacy. See Sections 1003.42; 1006.31(2)(a); 1006.34(2)(b), Florida Statutes.

Multicultural fairness: Through balanced representation of cultures and groups in multiple settings, occupations, careers, and lifestyles, the materials should support equal opportunity without regard for age, color, gender, disability, national origin, race, or religion. It is not the number of pages devoted to diversity, equity, or work roles, but the substance of what is stated and portrayed that matters most. For this reason, it can be misleading to count the number of pages or illustrations devoted to a social issue or group. It is more important to focus on the integration of social diversity throughout a set of instructional materials.

In addition to balanced representations, the portrayal of individuals and situations must exclude biases and stereotypes. These portrayals must promote an understanding and appreciation of the importance and contributions of diverse cultures and heritage.

Multicultural advocacy: The understanding and appreciation of multiple cultures extends beyond fair representation. It involves embracing a multicultural context, not just through pictures, but through information about ways to honor differences and deal with conflicts, promote a positive self-image for members of all groups, and provide for the development of healthy attitudes and values.

Effective treatment of multicultural issues requires consideration of the age and ability levels of students and whether or not it is appropriate to include multicultural issues in the study of a particular topic, such

as the memorization of a formula or equation. Overall, however, materials should reflect both multicultural fairness and advocacy.

In the subject are of MATHEMATICS, contributions of various cultures to the development of mathematics throughout the history should be included in the introduction of concepts, whenever appropriate. Multicultural representation also includes consideration of different learner types such as visual, auditory, kinesthetic, etc.

H. HUMANITY AND COMPASSION

Portrayal of the appropriate care and treatment of people and animals must include compassion, sympathy, and consideration of their needs and values and exclude hard-core pornography and inhumane treatment. See Sections 1003.42; 1006.31(2)(c); 1006.34(2)(b), Florida Statutes.

Inclusion of compassion: When providing examples in narrative or visuals, materials sometimes depict the care and treatment of people and animals. Generally, this means showing in some way a measure of compassion, sympathy, or consideration of their needs and feelings.

Exclusion of inhumanity: In the context of personal and family values, Florida expressly prohibits material containing *hard-core pornography*. In addition, although the definition of *inhumane treatment* can sometimes appear to be controversial, as in science research, there is general agreement that instructional materials should not advocate any form of inhumane treatment.

As with the evaluation of multicultural representation, it is important to consider the context of the subject and the age and abilities of the students.

Presentation

Features of presentation affect the practical usefulness of materials and the ease of finding and understanding content. These features include:

A. COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES
B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS
C. ORGANIZATION OF INSTRUCTIONAL MATERIALS
D, READABILITY OF INSTRUCTIONAL MATERIALS
E. PACING OF CONTENT
F. EASE OF USE OF MATERIALS

The following sections describe the presentation features expected for each of these areas.

A. COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES

Resources must be complete enough to address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course. See Sections 1006.29(2); 1006.34(2)(b), Florida Statutes.

Materials should contain support for students in completing instructional activities and assessments and for teachers in implementing all of the instructional elements. A variety of components can accomplish this purpose. Typically, materials will include test items, study guides, outlines and strategies for teaching, media supplements, learning activities, and projects.

The major components generally expected for student and teacher resources are listed below.

Student resources: Student materials typically include the major resource or program with text or narration, visuals, assignments, and assessments. Formats may include print, audio, visual, computer, or other media like CDs, DVDs, PPTs, or software adaptable for Smart Boards.

Effective instructional materials generally integrate the use of reference aids (e.g., index, glossary, maps, bibliography, graphic organizers, and pictures) with the topic being studied. Items that guide students through materials might include clearly labeled materials, directions and explanations, and assignments with menus of choices.

Review and practice activities might include participation activities such as digital simulations, role-playing situations, investigations, and hands-on practice assignments. Review activities might include self-checks or quizzes. Formats might include digital education games, student tutorials, worksheets, workbooks, journals, lab books, lab logs, charts, or maps. Feedback might be in the form of answer keys in student materials or in teacher materials.

Review works best as a logical extension of content, goals, objectives, and lessons, with increased similarity to real-life situations. Review activities should require students to recall or apply previously taught knowledge and skills. Frequent short reviews over time or space improve learning more than a concentrated review. Assignments and stages of small practice improve speed and accuracy.

Other components might include enrichment and remediation activities, additional resources, and tests and assessment tools either in the student materials or in the teacher's guide or edition.

In the subject area of MATHEMATICS, publishers must provide enrichment and remediation activities to the students and teachers in electronic format.

Teacher resources: Teacher materials typically include a teacher's edition with the annotated student text and copies of supplementary materials (print or digital) with answer keys, worksheets, tests, diagrams, etc., so that the teacher has to use only one guide. In-service training, workshops, and consulting services should be made available by publishers to support teachers in implementing instructional materials. Professional development is essential to the success of any program, especially when a program contains non-traditional elements. Publishers should clearly indicate the recommended amount and types of professional development that they will provide, and they should work with districts and schools to ensure that teachers receive the support that they need. The materials for the teacher should support continued teacher learning.
Support, guidelines, resources, or features such as the ones described below should be available to help teachers effectively implement materials in classroom and school settings.

(1) **Components and materials are easy to use:** Examples include clearance, license, or agreement for copying and use of materials; clear description and accurate directions for use of required equipment, facilities, resources, and environment; clearly labeled grade, lesson, content, and other information to identify components; and correct specifications for making instructional media and electronic programs work effectively.

(2) **Materials support lesson planning, teaching, and learning:** Examples include overview of components and objectives; background for lectures and discussions; technical terminology, and reinforcement and review strategies; scope and sequence chart for activities and planning; sample lesson plans; suggestions for individualized study, small-group and large-group presentations and discussions, school-to-work activities, field or laboratory experiences, safety procedures, and other extension activities; suggestions for integrating themes across the subject area or course curriculum and forming connections to other disciplines; and suggestions for parental and community involvement.

(3) **Suggestions are provided for adapting instruction for varying needs:** Examples include alternative approaches to teaching, pacing, and options for varied delivery of instruction such as media, tools, equipment, and emerging technology; strategies for engaging all students, such as open-ended questions to stimulate thinking, journals, hands-on investigations, explorations, and multisensory approaches; suggestions for addressing common student difficulties or adapting to multiple learning styles; and alternative reteaching, enrichment, and remediation strategies.

(4) **Guidelines and resources are provided on how to implement and evaluate instruction:** Examples include answers to work assignments, practice activities, and tests; sample projects or research results; suggestions for using learning tasks for classroom assessment; and guidelines for alternative assessments, such as sample checklists, rubrics, peer or performance assessments, and portfolios.

(5) Resources are provided to use in classroom activities: Examples include technology resources; lists of resources and references, reading strategies, materials to use for displays or photocopies ,classroom management strategies and documentation on how to manage the entire instructional program; and in-service workshops or consultation support from the publisher.

B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS

All components of an instructional package must align with each other, as well as with the curriculum. See Sections 1006.34(2)(b), Florida Statutes.

All components of an instructional package—teacher's edition and materials, student's edition and materials, workbook, supplementary materials, and others—must be integrated and interdependent and must correspond with each other. For example, support materials in the teacher's edition should align with student activities or assignments. They must match in content and progression of instructional activities.

C. ORGANIZATION OF INSTRUCTIONAL MATERIALS

The structure and format of materials must have enough order and clarity to allow students and teachers to access content and explicitly identify ideas and sequences. See Sections 1006.34(2)(a); 1006.34(2)(b), Florida Statutes.

Providing an explicit and teachable structure can double the amount of information remembered. Clear organization allows students and teachers to discriminate important pieces of information through skimming, reading, or browsing. Clear organization may be accomplished through a combination of features, but generally not through one feature alone.

Access to content: Some features help in searching and locating information, such as a table of contents; pull-down menu or sitemap of content; directions on how to locate information or complete assignments; an index for quick reference; goals and/or objectives, outlines, lists, or checklists for major sections; bibliographies and lists of resources; glossaries for quick access to major terms; and introductions, key concepts and themes, visual cues, illustrations, labeled examples, and labeled reviews or summaries.

Visible structure and format: At-a-glance features should signal the organization of content. The following features are desirable:

- Chapter or unit titles and/or frames;
- Headings and subheadings;
- Typographic cues such as bold, italics, or changes in size of type;
- Divisions of content such as borders, boxes, circles, highlighting, visual signposts, icons, or color cues;
- Diagrams, labels, and visuals placed near the related content; and numbering of pages and other components.

Objectives or a content outline may serve a similar purpose by introducing main ideas, providing guideposts to use in searching for key information, or serving as a checklist for self-assessment. Certain

types of brief narrative sections also contribute to clear organization. For example, the statement of a clear purpose with content organized around main ideas, principles, concepts, and logical relationships supports the unity and flow of information. Introductions also play a major role when they include anchoring ideas, a list of key points, or conceptual schemes such as metaphors. Summaries also can assist students in understanding the logical order of topics presented.

Logical organization: The pattern of organization of the content should be consistent and logical for the type of subject or topic. Patterns of organization may include comparison and contrast, time sequence, cause-effect or problem-solution-effect, concrete to abstract, introduction-review-extension (spiral structure), simple-to-complex, whole-part or part-whole, generalization-examples-review-practice, and conflict-inside view-structure.

D. READABILITY OF INSTRUCTIONAL MATERIALS

Narrative and visuals should engage students in reading or listening as well as in understanding of the content at a level appropriate to the students' abilities. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

Language style: Language style and visual features can influence the readability of materials. Yet, a popular tool for assessing readability has been the use of a *readability formula* of one type or another. These formulas tend to focus only on a few *countable* characteristics of language style such as the length of words, sentences, and/or paragraphs.

Other features are more important in establishing the readability of instructional materials, such as: organized, coherent text language and concepts familiar to the student; language that clarifies, simplifies, and explains information; transition words such as "yet," "also," "next," "for example," "moreover," or "however;" other phrases that create logical connections; words with concrete and specific images; active rather than passive voice; varied sentence structures and avoid both choppy sentences and unnecessary words; and specific questions or directions to guide student attention to visuals or key information.

Visual features: Visual features that improve readability include print that is dark and clear, with good contrast paper with clean-cut edges without glare, or computer screens without glare margins wide enough on a page or screen to allow easy viewing of the text chunking (sentence ends on same page as it begins); visuals that are relevant, clear, vivid, and simple enough for students to understand quantity of visuals suitable for the intended students—both lower ability students and higher ability students tend to require more visuals; unjustified text (ragged on the right) rather than justified (lined up on the right); visuals that contain information in a form different from the text; graphs, charts, maps, and other visual representations integrated at their point of use; and colors, size of print, spacing, quantity, and type of visuals suitable for the abilities and needs of the intended students.

E. PACING OF CONTENT

The amount of content presented at one time or the pace at which it is presented must be of a size or rate that allows students to perceive and understand it. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

It is important that materials contain “bite-size” chunks or blocks of information. The chunks should not be so large, nor the pacing so fast, as to overwhelm students. Neither should the chunks be so small, nor the pacing so slow, as to bore them.

F. EASE OF USE OF MATERIALS

Both print and other media formats of instructional materials must be easy to use and replace and be durable enough for multiple uses over time. See Sections 1006.29(4); 1006.38(3)(a); 1006.34(2)(b); 1006.38(5); 1006.38(6)(7)(8)(9), Florida Statutes.

Warranty: The actual physical and technical qualities of materials should match the description contained in the publisher’s warranty.

Use: Materials must be designed for practical use in the classroom and school environments. They must be easy to identify and store. Teachers and students must be able to access and use the materials. Some of the factors influencing their ease of use include number of components, size of components, packaging, quality of materials, equipment requirements, and cost to purchase or replace components.

The best choice about weight, size, and number of volumes depends on several factors, such as the organization of the content, how well separate volumes may fit time periods for instruction, and the ages of students. Technical production requirements, such as page limits or different types of bindings, may lead to multiple volumes.

Examples of classroom use include repeated copying of consumable materials and repeated use of other materials by students over time. Students should be able to easily use the materials and take home, in a convenient form, most of the material they need to learn for the course.

Technology-rich resources should work properly without the purchase of additional software and run without error. Electronic media for student use should be encoded to prevent accidental or intentional erasure or modification. As with textbooks, electronic media should allow students to easily access and interact with them without extensive supervision or special assistance.

The physical and technical qualities of materials should match with the resources of the schools. Materials such as videos, software, CDs, Internet sites, and transparencies may serve instructional purposes well but have little value unless they can be implemented with the school’s equipment. Publishers should include training, in-service, and consultation to help in effective use of the materials.

Durability: Students and teachers should be able to have materials that will be durable under conditions of expected use. For example, boxes, books, or other materials should not fall apart after normal classroom use. The packaging and form of materials should be flexible and durable enough for multiple uses over time. Durability includes considerations such as high-quality paper, ink, binding, and cover back, joints, body block and individual pages; worry-free technology that runs properly, with easy to hear, see, and control audio and visuals; and the publisher’s guarantee for replacement conditions and agreements for reproduction needed to effectively use the materials.

Cost: *Florida’s Commissioner of Education will consider the impact of cost in making final decisions.* Cost, while not a direct factor in ease of use, influences the ease with which materials can be obtained or replaced. The impact of cost can be complex to estimate. It requires considering the number of materials available at no additional cost with the purchase of the major program or text, the cost over the adoption period of several years, and the number of free materials to support implementation. Attractive features such as higher quality paper and visuals and greater use of color may escalate cost, without enhancing learning effectiveness.

Learning

The following features have been found to promote learning and apply to most types of learning outcomes.

A. MOTIVATIONAL STRATEGIES
B. TEACHING A FEW "BIG IDEAS"
C. EXPLICIT INSTRUCTION
D. GUIDANCE AND SUPPORT
E. ACTIVE PARTICIPATION
F. TARGETED INSTRUCTIONAL STRATEGIES
G. TARGETED ASSESSMENT STRATEGIES

The following sections describe the learning features expected for each of these priority areas.

A. MOTIVATIONAL STRATEGIES

Instructional materials must include features to maintain learner motivation. See Sections 1006.31(2)(e); 1006.34(2)(b); 1006.38(4), Florida Statutes.

Expectations: Materials should positively influence the expectations of students. Examples include: positive expectations for success; novel tasks or other approaches to stimulate intellectual curiosity; meaningful tasks related to student interests, cultural backgrounds, and developmental levels; activities with relevance to the student's life; thought-provoking challenges such as paradoxes, dilemmas, problems, controversies, and questioning of traditional ways of thinking; challenges that are neither too difficult to achieve nor so easy that students become bored; hands-on tasks in a concrete context, and images, sounds, analogies, metaphors, or humorous anecdotes; and variety, including the opportunity for students to ask their own questions, set their own goals, and make other choices during learning.

Feedback: Materials should include informative and positive feedback on progress. Examples include: frequent checks on progress, including testing; explanatory feedback with information about correctness of responses, how to avoid or correct common mistakes, and/or different approaches to use; and varied forms of assessments (self-assessment, peer assessment, and some learning tasks without formal assessments).

Appearance: Materials should have an appearance generally considered attractive to the intended students.

B. TEACHING A FEW "BIG IDEAS"

Instructional materials should thoroughly teach a few important ideas, concepts, or themes. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

Focus: Thoroughly teaching a few big ideas provides focus for the learner's attention. It provides an organizing framework for integrating new information.

Completeness: The thorough teaching of a few big ideas may focus on developing a deeper and more complete understanding of the major themes of a discipline, the content of the subject area, relationships to other disciplines, and the thinking and learning skills required for achieving the specified learning outcomes.

C. EXPLICIT INSTRUCTION

Instructional materials must contain clear statements of information and outcomes. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

Clarity of directions and explanations: To support success in learning, instructional materials should include clear presentation and explanations of purposes, goals and expected outcomes, concepts, rules, information and terms, models, examples, questions, and feedback.

For example, development of specific thinking skills requires an explicit statement of the particular *thinking skills* to be learned, along with the *strategies* or *steps to follow*. Explicit instruction for thinking skills might also involve showing *examples* of successful thinking contrasted with examples of poor thinking processes.

Similarly, the development of learning skills requires explicit directions about *when* and *how* to do activities such as note taking, outlining, paraphrasing, abstracting and analyzing, summarizing, self-coaching, memory strategies, persistence, preview and questioning, reading and listening, reflecting, and reciting.

Exclusion of ambiguity: Instructional materials should avoid terms and phrases with ambiguous meanings, confusing directions or descriptions, and inadequate explanations.

D. GUIDANCE AND SUPPORT

Instructional materials must include guidance and support to help students safely and successfully become more independent learners and thinkers. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

Level: The type of guidance and support that helps students to become more independent learners and thinkers is sometimes referred to as *scaffolding.* Scaffolding is a solid structure of support that can be removed after a job has been completed. As students gain proficiency, support can diminish, and students can encounter more complex, life-centered problems. Information and activities should provide guidance and support at the level that is needed—no more and no less. Too much support can squelch student interest and too little can lead to failure.

Guidance and support can be accomplished by a combination of the following features: organized routines; advance organizers or models such as condensed outlines or overviews, simplified views of

information, visual representations of new information during initial instruction, sample problems, questions to focus on key ideas or important features; examples of solved problems; explanations of how the problems were solved; examples of finished products or sample performances; analogies, metaphors, or associations to compare one idea to another; prompts or hints during initial practice; step-by-step instructions; immediate and corrective feedback on the accuracy of performance of each step or task, on how to learn from mistakes, and on how to reach the correct answer; simulations with features for realistic practice; and opportunities for students to do research; and to organize and communicate results.

Adaptability: Guidance and support must be adaptable to developmental differences and various learning styles. For example, young children tend to understand concepts in concrete terms and over-generalize new concepts. Some students need more time, some tend to be more impulsive than reflective, some have trouble distinguishing relevant from irrelevant information, and some have better written than spoken language skills.

Approaches for developmental differences and learning styles of students include a variety of *activities* such as structured and unstructured activities; independent and group work, teacher-directed and discovery learning, visual and narrative instruction, hands-on activities, open-ended activities, practice without extrinsic rewards or grades; simple, complex, concrete, and abstract examples; variable pacing or visual breaks; and a variety of *modalities* for the various learning styles of students, such as linguistic-verbal, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist.

E. ACTIVE PARTICIPATION OF STUDENTS

Instructional materials must engage the physical and mental activity of students during the learning process. See Sections 1006.31(2)(e); 1006.34(2)(b), Florida Statutes.

Assignments: Instructional materials should include organized activities of periodic, frequent, short assignments that are logical extensions of content, goals, and objectives.

Student responses: Assignments should include questions and application activities during learning that give students opportunities to respond. Active participation of students can be accomplished in a variety of ways. For example, information and activities might require students to accomplish types of activities that include: respond orally or in writing; create visual representations (charts, graphs, diagrams, and illustrations); generate products; generate their own questions or examples; think of new situations for applying or extending what they learn; complete discovery activities; add details to big ideas or concepts from prior knowledge; form their own analogies and metaphors; practice lesson-related tasks, procedures, behaviors, or skills; and/or choose from a variety of activities.

F. TARGETED INSTRUCTIONAL STRATEGIES

Instructional materials should include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements. See Sections 1006.31(2)(e); 1006.34(2)(b); 1003.42, Florida Statutes.

Alignment: Research has documented the strategies that effectively teach different types of learning outcomes. The learning strategies included in instructional materials should match the findings of

research for the targeted learning outcomes. Different types of learning outcomes require different strategies. For example, a strategy for memorizing verbal information might be helpful, but it would not align with the strategies required for learning a concept or for learning how to solve a problem.

Completeness: Not only should strategies be aligned, they also should be complete enough to effectively teach the targeted outcomes. For example, while the explanation of a problem-solving method or model would be appropriate, other strategies also would be necessary in order for students to learn how to resolve different types of problems.

Research summary: Researchers sometimes use different terms for some similar outcomes. For example, *thinking skills* and *metacognition* refer to some of the same types of skills. The following alphabetical list includes terms as they appeared in research, even though some terms clearly overlap with each other.

- attitudes
- cognitive strategies
- comprehension/ understanding
- concepts
- creativity
- critical thinking
- insight
- metacognition
- motor skills
- multiple intelligences
- problem solving
- procedural knowledge, principles, and rules
- scientific inquiry
- thinking skills
- verbal information, knowledge, or facts

The following section summarizes the research findings for each of these types of learning outcomes.

Effective Teaching Strategies

- **Teach *Attitudes***
  - Explain and show consequences of choices, actions, or behaviors.
  - Provide relevant human or social models that portray the desired choices, actions, or behaviors.
- **Teach *Reading***
  - Monitor and reflect upon the effectiveness of the reading process used.
  - Provide appropriate reading strategies.
  - Link instruction to effective reading.
- **Teach *Cognitive Strategies***
  - Monitor and reflect upon the effectiveness of the reading process used.
  - Encourage and/or teach:
    - Organizing and summarizing information;
    - Self-questioning, self-reflection, and self-evaluation;
    - Reference skills; and
    - When and how to use these different skills.

- **Teach *Comprehension/Understanding***
  - Outline, explain, or visually show what will be read/learned in a simple form.
  - Explain with concrete examples, metaphors, questions, or visual representations.
  - Require students to relate new readings to previously learned information.
  - Require students to paraphrase or summarize new information as it is read.
  - Require students to construct a visual representation of main ideas (map, table, graphs, Venn diagram, etc.).
  - Give students opportunities to add details, explanations, or examples to basic information.
  - Require application of knowledge or information.
- **Teach *Concepts***
  - Provide clear understanding of each concept.
  - Point out important and features or ideas.
  - Point out examples of the concept, showing similarities and differences.
  - Include practice in organizing and classifying concepts.
  - Include a wide range of examples in a progressive presentation from simple to more complex examples.
  - Emphasize relationships between concepts.
- **Teach *Creativity***
  - Provide examples of creativity.
  - Include models, metaphors, and analogies.
  - Encourage novel approaches to situations and problems.
  - Show and provide practice in turning a problem upside down or inside out or by changing perceptions.
  - Encourage brainstorming.
  - Include open-ended questions and problems.
  - Provide opportunities of ungraded, unevaluated creative performance and behavior.
- **Teach *Critical Thinking***
  - Create conflict or perplexity by using paradoxes, dilemmas, or other situations to challenge concepts, beliefs, ideas, and attitudes.
  - Focus on how to recognize and generate proof, logic, argument, and criteria for judgments.
  - Include practice in detecting mistakes, false analogies, relevant vs. irrelevant issues, contradictions, discrepant events, and predictions.
  - Provide practice in drawing inferences from observations and making predictions from limited information.
  - Explain and provide practice in recognizing factors or biases that may influence choice and interpretations such as culture, experience, preferences, desires, interests, and passions, as well as systematic thinking.
  - Require students to explain how they form new conclusions and how and why present conclusions may differ from previous ones.

- **Teach *Inquiry***
  - Emphasize technological design as inquiry and include discovery activities.
  - Provide opportunities for experimental design.
  - Provide opportunities for critical thinking.
  - Facilitate the collection, display, and interpretation of data.
  - Promote careful observation, analysis, description, and definition.
- **Teach *Metacognition***
  - Explain different types of thinking strategies and when to use them.
  - Encourage self-evaluation and reflection.
  - Include questions that challenge students to wonder why they are doing what they are doing.
  - Guide students in how to do systematic inquiry, detect flaws in thinking, and adjust patterns of thinking.
- **Teach *Technology***
  - Provide a mental and physical model of desired performance.
  - Describe steps in the performance.
  - Provide practice with kinesthetic and corrective feedback (coaching).
- **Teach *Multiple Intelligences/Learning Modalities***
  - Visual learning modality focuses on seeing, watching and looking.
  - Auditory learning modality focuses on hearing and responding to verbal information and instructions.
  - Motor/kinesthetic learning modality focuses on active involvement and hands-on activities.
  - Verbal-linguistic dimension focuses on reasoning with language, rhythms, and inflections, such as determining meaning and order of words (stories, readings, humor, rhyme, and song).
  - Logical-mathematical dimension focuses on reasoning with patterns and strings of symbols (pattern blocks, activities to form numbers and letters).
  - Musical dimension focuses on appreciation and production of musical pitch, melody, and tone.
  - Spatial dimension focuses on activities of perceiving and transforming perceptions.
  - Bodily kinesthetic dimension focuses on use and control of body and objects.
  - Interpersonal dimension focuses on sensing needs, thoughts, and feelings of others.
  - Intrapersonal dimension focuses on recognizing and responding to one's own needs, thoughts, and feelings.
  - Naturalist dimension focuses on appreciation of nature and the environment and on comparing, contrasting, and classifying attributes.
- **Teach *Problem Solving***
  - Assure student readiness by diagnosing and strengthening related concept, rule, and decision-making skills.
  - Provide broad problem-solving methods and models.
  - Include practice in solving different types of problems.
  - Begin with highly structured problems and then gradually move to less structured ones.
  - Use questions to guide thinking about problem components, goals, and issues.

- Provide guidance in observing and gathering information, asking appropriate questions, and generating solutions.
- Include practice in finding trouble, inequities, contradictions, or difficulties and in reframing problems.

- **Teach *Procedural Knowledge, Principles, and Rules***
  - Define context, problems, situations, or goals and appropriate procedures.
  - Explain reasons that procedures work for different types of situations.
  - Define procedures—procedures include rules, principles, and/or steps.
  - Provide vocabulary and concepts related to procedures.
  - Demonstrate step-by-step application of procedures.
  - Explain steps as they are applied.
  - Include practice in applying procedures.
- **Teach *Scientific Inquiry***
  - Explain process and methods of scientific inquiry.
  - Explain and provide examples of (a) hypotheses formation, (b) valid procedures, (c) isolating variables, (d) interpretation of data, and (e) reporting findings.
  - Encourage independent thinking and avoidance of dead ends or simplistic answers.
  - Require students to explain, verify, challenge, and critique the results of their inquiry.
- **Teach *Thinking Skills***
  - Introduce different types of thinking strategies.
  - Explain context or conditions of applying different strategies.
  - Provide definitions, steps, and lists to use in strategies.
  - Include examples of different types of thinking strategies, including how to think with open-mindedness, responsibility, and accuracy.
  - Emphasize persisting when answers are not apparent.
  - Provide practice in applying, transferring, and elaborating on thinking strategies.
  - Integrate metacognitive, critical, and creative-thinking skills.
- **Teach *Verbal Information, Knowledge, or Facts***
  - Provide a meaningful context to link new information and past knowledge.
  - Organize information into coherent groups or themes.
  - Use devices to improve memory such as mnemonic patterns, maps, charts, comparisons, groupings, highlighting of key words or first letters, visual images, and rhymes.
  - Identify main ideas, patterns, or relationships within information or sets of facts.

G. TARGETED ASSESSMENT STRATEGIES

Instructional materials should include assessment strategies that are known to be successful in determining how well students have achieved the targeted learning outcomes. See Sections 1006.31(2)(e); 1006.34(2)(b); 1006.38(4), Florida Statutes.

Alignment: The assessment strategies should match the learner performance requirements for the types of learning outcomes that have been targeted for the subject matter, course, or course category.

Different strategies are appropriate for assessing different types of learning outcomes. For example, a strategy for testing the acquisition of verbal information would not match the requirements for testing whether or not a student has learned a concept or learned how to solve a problem.

The term "assessment," as used in this section, refers to testing or other strategies that assess student progress as a result of learning activities. The results of such assessment provide information about where to strengthen instruction. But it is very important to ask the right questions. If the type of question matches the type of learning outcome, then students and teachers have relevant information about learning progress.

Completeness: In addition to including assessment strategies that align with the performance requirements of the targeted learning outcomes, the strategies should be complete enough to effectively assess the learner's performance with regard to the targeted outcome. For example, a test item that requires the student to state a rule does not assess whether or not the student knows how to *use* the rule.

Research summary: The research summary for effective assessment strategies for different types of learning outcomes follows the same alphabetical sequence as the previous section.

Effective Assessment Strategies

- **Assess *Attitudes*:**
  - Provide various situations.
  - Require choices about behaviors.
- **Assess *Cognitive Strategies*:**
  - Provide learning tasks.
  - Require students to choose good strategies for learning and/or to learn new materials without teacher guidance.
  - Require students to discuss and explain methods used for various learning tasks.
- **Assess *Comprehension/Understanding*:**
  - Provide topic.
  - Require summary or restatement of information.
  - Provide new context.
  - Require application of information.
  - Provide several statements using words different from the initial teaching.
  - Require identification of the correct meaning.
- **Assess *Concepts*:**
  - Provide new examples and non-examples.
  - Require identification or classification into the correct categories.
- **Assess *Creativity:***
  - Provide new problems to "turn upside down," study, or resolve—these could be performances, presentations, or products.
  - Require products or solutions to fit within the particular functions and resources.
  - Provide situations requiring novel approaches.

- **Assess *Critical Thinking*:**
    - Require students to evaluate information or results.
    - Require the use of analysis and research.
- **Assess *Insight:***
    - Provide situations for inquiry and discovery.
    - Provide situations for manipulation.
- **Assess *Metacognition***:
    - Provide different situations or problems.
    - Require students to identify types of thinking strategies to analyze and evaluate their own thinking.
- **Assess *Multiple Intelligences/Learning Modalities*:**
    - Provide situations in the multiple intelligence/learning modalities that are targeted, e.g., verbal-linguistic, musical, or other learning modalities.
    - Provide situations in several multiple intelligence/learning modalities, to allow choice.
    - Require performance in the targeted or chosen multiple intelligence/learning modality.
- **Assess *Motor Skills*:**
    - Provide situations and resources for performance of the skill.
    - Include checklist for evaluation.
- **Assess *Problem Solving*:**
    - Require students to choose types of problem-solving strategies for different situations.
    - Require solutions to structured and unstructured, simple and complex problems.
- **Assess *Procedural Knowledge, Principles, and Rules*:**
    - Provide situations that require students to recognize the correct use of procedures, principles, or rules with routine problems.
    - Require students to state procedures, principles, or rules.
    - Require students to choose which procedures, principles, or rules to apply in different situations.
    - Provide situations that require students to demonstrate the correct use of procedures, principles, or rules with routine problems.
- **Assess *Scientific Inquiry*:**
    - Provide situations or problems that require speculation, inquiry, and hypothesis formation.
    - Provide research, hands-on activities, and conclusions.
- **Assess *Thinking Skills***:
    - Require students to summarize different types of thinking strategies.
    - Provide situations that require students to choose the best type of thinking strategy to use.
    - Require students to detect instances of open vs. closed-mindedness.
    - Require students to detect instances of responsible vs. irresponsible and accurate vs. inaccurate applications of thinking strategies.
    - Provide situations that require the student's persistence in order to discover or analyze information to obtain answers to specific questions.
    - Require students to apply specific thinking strategies to different real-world situations.

- **Assess *Verbal Information, Knowledge, or Facts:***
    - Require students to recall information.
    - Require students to restate information.
    - Require students to understand information.

In the subject area of MATHEMATICS, it is particularly important to frequently assess the progress of students. Student understanding of mathematical concepts proceed to increasing levels of complexity over time. Thus, students who miss the prerequisite knowledge have great difficulty in making progress in later grades. Early and frequent formative assessment of progress helps teachers in determining what activities or teaching methods may be appropriate for individual students or whole class instruction.

Criteria for Evaluation

The instructional materials adoption process must be fair to all publishers who take the time and expense to submit their materials. Applying evaluation criteria consistently to each submission assures that the materials will be judged fairly.

Regardless of format or technology, effective materials have certain characteristics in common, and the basic issues, important for the evaluation of instructional materials, apply to all subject areas and all formats. These issues are addressed in Florida's list of priorities and the criteria as detailed in the previous pages of this document. A link to the evaluation instrument used by the state instructional materials reviewers is found at the website listed below. Evaluators will use the criteria-based instrument to engage in systematic reflection of the processes they follow and decisions they make about the quality of materials submitted by publishers.

The extensive research base and review processes used to identify these criteria establish their validity as an integral part of Florida's instructional materials adoption system. Applying these criteria consistently to each submission helps assure that the materials submitted by publishers will be judged fairly.

The state instructional materials reviewers will complete an electronic evaluation instrument for each submission. The electronic evaluation serves as the official record of each state instructional materials reviewer's evaluation of the submission. The evaluation is accessed through the Florida Department of Education's online evaluation system at https://app2.fldoe.org/BII/InstructMat/Evaluation/Account/Login.aspx.

Link to Curriculum Requirements

The course descriptions for **Mathematics** can be found at the following link:
http://www.corestandards.org/the-standards/mathematics

Federal Requirements for the National Instructional Materials Accessibility Standard (NIMAS)

National Instructional Materials Accessibility Standard (NIMAS) guides the production and electronic distribution of digital versions of textbooks and other instructional materials so they can be more easily converted to accessible formats, including Braille and text-to-speech. A National Instructional Materials Access Center (NIMAC) has been established to receive and catalog publishers' electronic files of print instructional materials in the NIMAS format.

These files will be used for the production of alternate formats as permitted under the law for students with print disabilities. Under these guidelines, “textbook” means the principal tool of instruction such as state-adopted instructional materials used in the classroom. It is a printed book or books that contain most, if not all, of the academic content a student needs to learn to meet the State or Local Education Agency’s curriculum requirements for that subject area. “Related core materials” are printed materials, other than textbooks, designed for use by students in the classroom in conjunction with a textbook and which, together with the state adopted textbook, are necessary to meet the curriculum requirements for the intended course. The materials should be directly related to the textbook and wherever possible they should be published by the publisher of the textbook. Related core materials do not include materials that are not written and published primarily for use by students in the classroom (e.g., trade books not bundled with the textbook, newspapers, and reference works) or ancillary or supplemental materials that are not necessary to meet the curriculum requirements for the intended course. For purposes of these definitions, the term “curriculum requirements for the intended course” refers to relevant curriculum standards and requirements as established by a state educational agency or local educational agency.

The details of the metadata elements required as part of the NIMAS File set will be found at http://www.nimac.us/docs/Metadata0509.DOC. Please note that some elements are required, while others are optional. Some fields also allow for multiple entries (e.g., subject terms).

Complete information concerning NIMAS and NIMAC can be found at http://nimas.cast.org and http://www.nimac.us. (IDEA-2004).

Questions from publishers concerning electronic files in Florida can be directed to Leanne Grillot at Leanne.Grillot@fldoe.org.

Glossary of Terms

Addition and subtraction within 5, 10, 20, 100, or 1000: Addition or subtraction of two whole numbers with whole number answers, and with sum or minuend in the range 0-5, 0-10, 0-20, or 0-100, respectively. Example: 8 + 2 = 10 is an addition within 10, 14 – 5 = 9 is a subtraction within 20, and 55 – 18 = 37 is a subtraction within 100.

Associative property of addition. See Table 3 in this Glossary.

Associative property of multiplication. See Table 3 in this Glossary.

Commutative property. See Table 3 in this Glossary.

Computation algorithm. A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly. *See also:* computation strategy.

Computation strategy. Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another. *See also:* computation algorithm.

Counting on. A strategy for finding the number of objects in a group without having to count every member of the group. For example, if a stack of books is known to have 8 books and 3 more books are added to the top, it is not necessary to count the stack all over again. One can find the total by counting on—pointing to the top book and saying "eight," following this with "nine, ten, eleven. There are eleven books now."

Expanded form. A multi-digit number is expressed in expanded form when it is written as a sum of single-digit multiples of powers of ten. For example, 643 = 600 + 40 + 3.

Fraction. A number expressible in the form a/b where a is a whole number and b is a positive whole number. (The word fraction in these standards always refers to a non-negative number.) *See also:* rational number.

Identity property of 0. See Table 3 in this Glossary.

Line plot. A method of visually displaying a distribution of data values where each data value is shown as a dot or mark above a number line. Also known as a dot plot.[3]

Multiplication and division within 100: Multiplication or division of two whole numbers with whole number answers, and with product or dividend in the range 0-100. Example: 72 ÷ 8 = 9

Multiplicative inverses. Two numbers whose product is 1 are multiplicative inverses of one another. Example: 3/4 and 4/3 are multiplicative inverses of one another because 3/4 × 4/3 = 4/3 × 3/4 = 1.

Number line diagram. A diagram of the number line used to represent numbers and support reasoning about them. In a number line diagram for measurement quantities, the interval from 0 to 1 on the diagram represents the unit of measure for the quantity.

Properties of equality. See Table 4 in this Glossary.

Properties of operations. See Table 3 in this Glossary.

Tape diagram. A drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model.

Transitivity principle for indirect measurement. If the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C. This principle applies to measurement of other quantities as well.

Visual fraction model. A tape diagram, number line diagram, or area model.

Whole numbers. The numbers 0, 1, 2, 3,...

Table 3

The properties of operations

Here a, b and c stand for arbitrary numbers in a given number system. The properties of operations apply to the rational number system, the real number system, and the complex number system.

Associative property of addition	$(a + b) + c = a + (b + c)$
Commutative property of addition	$a + b = b + a$
Additive identity property of 0	$a + 0 = 0 + a = a$
Existence of additive inverses	For every a there exists $-a$ so that $a + (-a) = (-a) + a = 0$
Associative property of multiplication	$(a \times b) \times c = a \times (b \times c)$
Commutative property of multiplication	$a \times b = b \times a$
Multiplicative identity property of 1	$a \times 1 = 1 \times a = a$
Existence of multiplicative inverses	For every $a \neq 0$ there exists $1/a$ so that $a \times 1/a = 1/a \times a = 1$
Distributive property of multiplication over addition	$a \times (b + c) = a \times b + a \times c$

Table 4
The properties of equality

Here *a, b* and *c* stand for arbitrary numbers in the rational, real, or complex number systems.

Reflexive property of equality	$a = a$
Symmetric property of equality	If $a = b$, then $b = a$.
Transitive property of equality	If $a = b$ and $b = c$, then $a = c$.
Addition property of equality	If $a = b$, then $a + c = b + c$
Subtraction property of equality	If $a = b$, then $a - c = b - c$
Multiplication property of equality	If $a = b$, then $a \times c = b \times c$
Division property of equality	If $a = b$ and $c \neq 0$, then $a \div c = b \div c$.
Substitution property of equality	If $a = b$, then b may be substituted for a in any expression containing a.

[3]Adapted from Wisconsin Department of Public Instruction, op. cit.

APPENDIX A

The following seven criteria for resources aligned to CCSS in Mathematics were developed by Jason Zimba, one of the authors of the Common Core State Standards. This outline should guide development of curriculum modules and accompanying materials.

1. **Promote Effectiveness**

   Materials must help students learn mathematics so they can meet the indicated Standards for Mathematical Content. Materials must also equip teachers and students to develop the varieties of expertise described in the Standards for Mathematical Practice.

2. **Quality Materials**

   Materials must be mathematically correct. The beauty and applied power of the subject should occasionally be evident to those who are following the thread.

3. **Develop Mathematical Practices**

   Materials must be designed to foster a classroom environment in which students can engage in, and develop, the varieties of expertise described in the Standards for Mathematical Practice. Developers of mathematics resources, curriculum and assessments should briefly explain how their materials aim to do this.

4. **Balance of Approach**

   Materials must reflect the Standards' balanced approach to mathematics, stressing both conceptual understanding as well as procedural skill and fluency. Specific aspects of achieving this balance include:

   a. Balance of Activities and Tasks. The activities that students do and the problems they work on must exhibit balance along various dimensions. For example, some activities and tasks should call for procedural skill and fluency alone; others should call for conceptual understanding; still others should require skill and understanding in equal measure. Some should be brief practice exercises; others should require longer chains of reasoning. Some should be abstract; others should be contextual.
   b. Balance of how time is spent. There should be time for group discussion and debate; time for solitary reflection and thoughtful practice; and time for unreflective skill building.
   c. Common sense in achieving balance. Not every task, activity, or workweek has to be balance in these ways. It is reasonable to have "spiky" phases, during which tasks, activities, and time are concentrated in a single mode.

5. Capacity-building

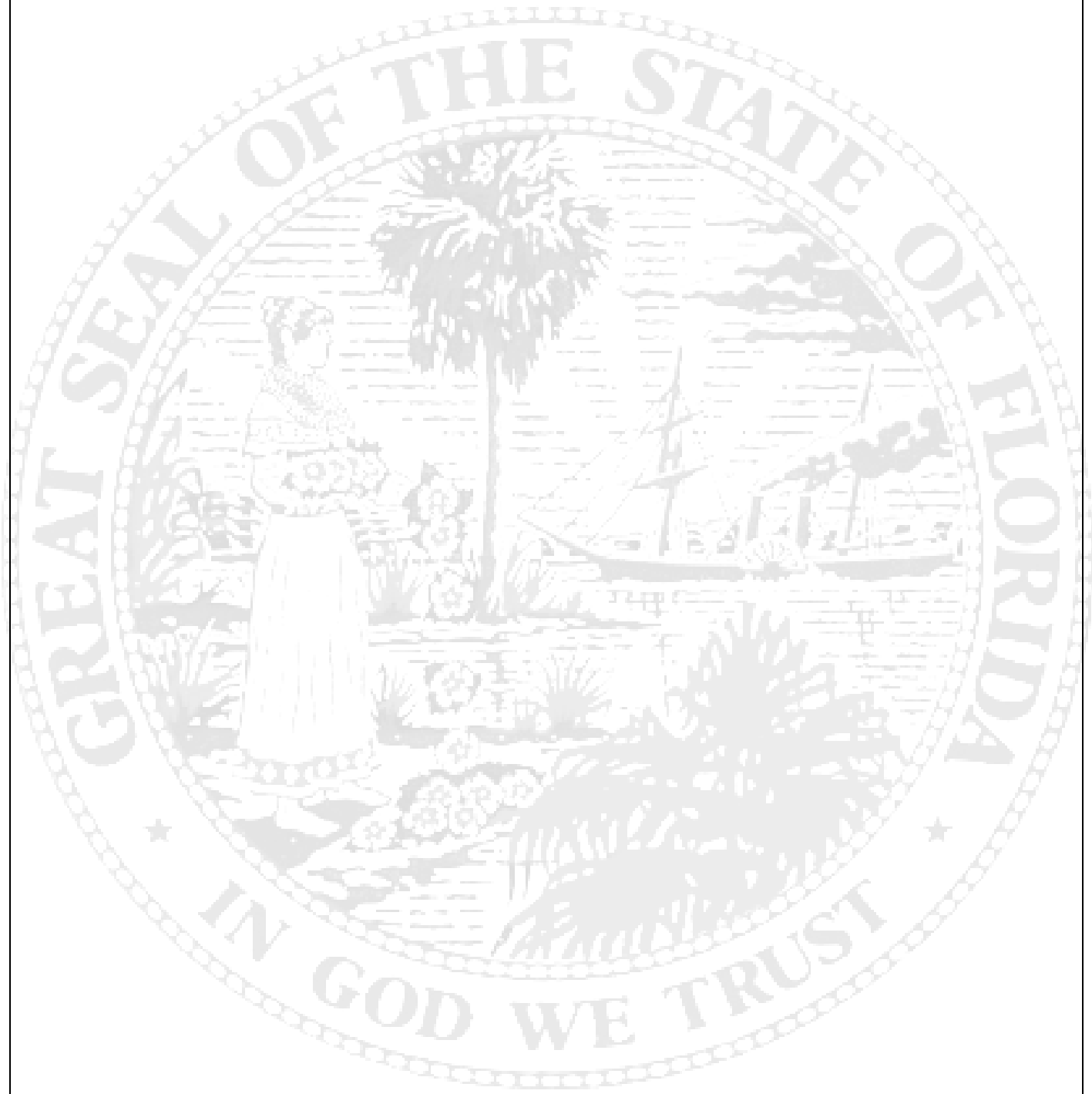
Teacher-directed components of the curriculum materials should draw the teacher's attention explicitly to nuances in the content being addressed as well as to specific opportunities to foster mathematical practices in the study of that content.

6. Content Alignment

Content standards are statements—not topics. Coverage of topics is therefore not a guarantee of alignment, and it may even affect alignment negatively when the coverage is wide or shallow. Content alignment consists in the degree of focus on high priority material and depth of treatment of it, and in mathematical coherence and elegant development of ideas.
Cluster headings, which are located in each course description after the Standards for Mathematical Practice in bold-type under each shaded title, often unify the standards in the cluster by communicating their joint intent. Aligning to the Standards requires taking into account the guidance to be gained from cluster headings, grade-level introductions, and so forth. In the context of a multi-grade progression, alignment also means treating the content in ways that take into account the previous stage of the progression and prefigure the next.

7. Comprehensiveness

Materials must give teachers workable strategies for helping students meet the Standards who have special needs, such as students with disabilities, English language learners, and gifted students.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