Florida's Instructional Materials Specifications for the 2003-2004 Adoption

Grades K-8

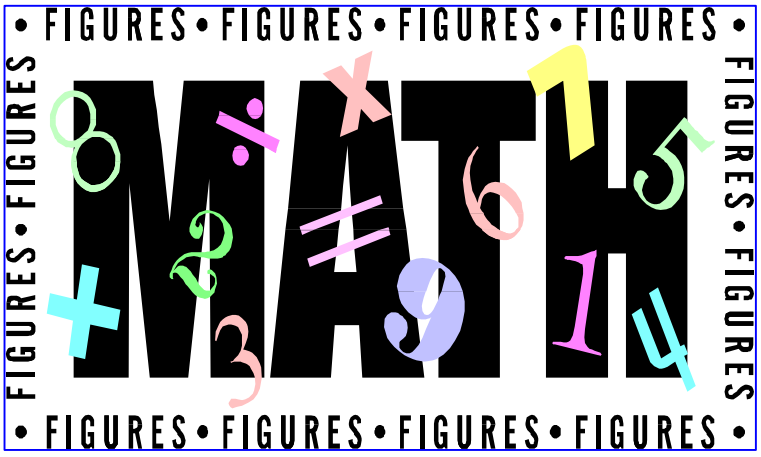

TABLE OF CONTENTS

Florida Perspective **1**
Publisher's Submissions **20**
Major Priorities **21**
Content **21**
Presentation **31**
Learning **43**
Criteria for Evaluation **59**

Appendices .....
FLORIDA'S CURRICULUM REQUIREMENTS
Introduction - Sunshine State Standards. ……..**67**
Sunshine State Standards. ……..……..**69**
Grade Level Expectations……**82**
Course Descriptions ..... *Listed Individually*
Florida's Requirements for Braille Textbook Production

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Florida Perspective

The Florida Vision

The mathematics vision statement set forth in the *Florida Curriculum Framework: Mathematics*, 1996, a support document for the implementation of school improvement in Florida, describes many aspects of a successful mathematics program. That statement (page 11) reads as follows:

> In mathematics teaching and learning
>
> - students are excited by, are interested in, and value their mathematical activities;
> - students work together and individually to find solutions to real problems;
> - technology and other tools are used as an integral part of the teaching and learning process;
> - learning is conceptually based, meaningful, and connected within mathematics and with other disciplines, using real-world phenomena;
> - the community has high but achievable expectations for all students;
> - assessment is an integral part of the teaching and learning process;
> - opportunities for both written and oral communication, as well as reflective thinking, are regularly integrated into the mathematics learning activities; and teaching strategies and learning environments promote mathematics equity for all students.

Among the assumptions underlying the vision are these :

- Cultural diversity enriches the learning environment.
- Instructional programs and teaching strategies should accommodate diverse learning styles and needs.
- Excellence in mathematics teaching and learning grows from a commitment shared by teachers, students, parents, administrators, and the community at large.

This vision from the 1996 *Florida Curriculum Framework* is very similar to the vision that appears in the *Principles and Standards for School Mathematics*, published in 2000 by the National Council for Teachers of Mathematics. That vision is more explicit regarding problem solving, stating (page 3) that students

> …draw on knowledge from a wide variety of mathematical topics, sometimes approaching the same problem from different mathematical perspectives or representing the mathematics in different ways until they find methods that enable them to make progress. Teachers help students make, refine, and explore conjectures on the basis of evidence and use a variety of reasoning and proof techniques to confirm or disprove those conjectures.

The Florida *Sunshine State Standards* (1996) are statements that define what Florida students are expected to know and be able to do as they complete various grade clusters, K-2, 3-5, 6-8, and 9-12. They address five major content strands; problem solving, technology use, and student communication are embedded across the strands. These *Standards* were developed by Florida mathematics educators with due attention to standards developed by other states and to the NCTM *Standards* published in 1989. By statute, instruction in Florida's public schools must include the *Sunshine State Standards*.

The *Sunshine State Standards* were developed to help meet the Goal 3 Standards. Goal 3, one of seven major goals for the school improvement and accountability system in Florida, deals with student performance. Goal 3 states:

> Students successfully compete at the highest levels nationally and internationally and are prepared to make well-reasoned, thoughtful and healthy lifelong decisions (*Florida Curriculum Framework Mathematics*, page 13).

The Goal 3 Standards state that schools are accountable for preparing all students to be: information managers, effective communicators, numeric problem solvers, creative and critical thinkers, responsible workers, resource managers, systems managers, cooperative workers, effective leaders, and multiculturally sensitive citizens. The *Florida Comprehensive Assessment Test* (FCAT) is one measure of progress toward the *Sunshine*

State Standards and toward achieving the first four Goal 3 Standards for students. Complete statements of the first four Goal 3 Standards follow:

> Standard 1: Florida students locate, comprehend, interpret, evaluate, maintain, and apply information, concepts, and ideas found in literature, the arts, symbols, recordings, video and other graphic displays, and computer files in order to perform tasks and/or for enjoyment.
>
> Standard 2: Florida students communicate in English and other languages using information, concepts, prose, symbols, reports, audio and video recordings, speeches, graphic displays, and computer-based programs.
>
> Standard 3: Florida students use numeric operations and concepts to describe, analyze, disaggregate, communicate, and synthesize numeric data, and to identify and solve problems.
>
> Standard 4: Florida students use creative thinking skills to generate new ideas, make the best decision, recognize and solve problems through reasoning, interpret symbolic data, and develop efficient techniques for lifelong learning (pages 16 – 18, *Florida Curriculum Framework Mathematics*).

In addition to the goals defined thus far, Florida has specific course descriptions for all secondary courses (grades 6-12). The basic assumptions for mathematics education in Florida, as they appear in all secondary course descriptions that have been aligned with the *Sunshine State Standards* are:

- All students have access to calculators and computers.
- Classroom activities are student-centered, emphasizing concrete experiences and active/experiential learning.
- All courses have increased emphasis on problem solving, estimation, and real-world applications.
- Evaluation includes alternative methods of assessment.
- All strands addressed in the *Sunshine State Standards* are developed across the PreK-12 curriculum.

Taken together, these vision and Goal 3 statements establish demanding goals for the mathematics classroom. In addition to the documents that have been mentioned thus far, the Florida Department of Education has also developed *Grade Level Expectations* (1999) for mathematics in grades K-8 to better define reasonable progress toward the *Standards* at all grade levels. These are recommended by the Department of Education but are not mandated by state law.

Florida's Teaching and Learning Challenges

Teachers and students of mathematics in the state of Florida face many challenges in this first decade of the twenty-first century.

Need for Qualified Teachers

There is an extreme shortage of qualified mathematics teachers. Many of the 6-12 teachers in mathematics classrooms are teaching out-of-field. Many certified teachers at all levels need professional development in current mathematics content and pedagogy. Many teachers need to witness and learn new approaches to teaching to assure that they will be able to:

- use concrete materials, calculators, computers, and the Internet;
- build mathematical concepts by using the concrete to pictorial to abstract sequence and effectively link the three stages;
- encourage a more active role for students through team and group activities;
- build true classroom communication regarding mathematics;
- diagnose and correct students' errors and misconceptions;
- help students to read mathematics text;
- use alternative assessment strategies and help the students to learn self-assessment skills; and
- master techniques to accommodate the needs of a diverse population where all students are expected to reach their highest potential.

High Expectations

Teachers and students are engaged in meeting the challenges of high expectations. Successful completion of Algebra I (or its equivalent) is now required for high school graduation. Scores on the *Florida Comprehensive Assessment Test* (FCAT), which includes mathematics, reading, and writing, are a major factor in the grading of schools, part of the current accountability system in Florida. The FCAT mathematics test places a major emphasis on problem solving. Students must be able to perform computation, but computation is usually embedded in problem-solving contexts. Many of the multiple-choice items and performance tasks require the students to apply knowledge from two or more mathematics strands. The item contexts are taken from other content areas. The open-ended performance tasks require students to demonstrate their work and/or explain their thinking; these responses are scored holistically with rubrics.

There is no doubt that FCAT has influenced classroom activities. Many mathematics teachers and supervisors across the state have welcomed the problem- solving focus and are structuring instruction to address higher cognitive levels. Unfortunately, in some

cases, the focus has shifted away from instruction to test preparation. Florida teachers need encouragement and assistance in keeping the focus on excellent instruction for the teaching and learning of mathematics.

The movement toward higher expectations combined with the need to address all strands makes the list of mathematics objectives appear never ending. Teachers need instructional materials that provide direction and assistance in planning instruction across the grades.

Classroom Diversity

Florida's student population is growing in both numbers and diversity. Many of our classrooms are crowded; class size is of great concern. Additionally, classrooms include students with varied abilities, learning styles, and learning rates. There are students who are learning English as a second language, who do not read on grade level, and who are "at risk" for a variety of reasons. Classroom teachers need materials that will help them to meet the needs of all students.

Teachers also need more time to teach. Good instructional materials must provide teachers with a variety of materials so they do not have to spend time in developing new materials. When they do need to adapt or modify materials, they should be able to quickly do so to better meet the needs of students with diverse learning styles, experiences, and abilities.

Guiding Principles for Mathematics Education

Chapter 2 of the *Principles and Standards* for School Mathematics, 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.

These six principles are so closely associated that it is impossible to separate them and their effects. It is obvious that instructional materials influence and are influenced by all these principles, yet the curriculum principle is the one that is most closely related to instructional materials.

An effective curriculum:

- focuses on important mathematics that students will use in life and in subsequent mathematics study;
- identifies the "big ideas" in mathematics;
- consists of separate stands and provides for the connection and interpretation of strands:
- forms a coherent whole, aiming toward a particular goal in each lesson but fitting together across the year and from one year to another; and
- provides guidance regarding the scope and sequence of mathematics, the degree of attention that should be given to particular topics at particular times and when mastery of a topic is expected.

Curriculum should not be driven by instructional materials. However, quality instructional materials should aim toward these same goals and can be enormously helpful to teachers and administrators and, in turn, to students. In Florida, the curriculum must include and may exceed the *Sunshine State Standards*.

Effective instructional materials help all students to learn mathematics, help all teachers to provide instruction and to continue to learn more about teaching, include an array of assessment approaches to yield feedback about learning and teaching, and incorporate technology into the teaching and learning.

Major Topics and Goals, K-8

This material is arranged according to the strands in the *Sunshine State Standards*. It is entirely appropriate to identify the major topics at the grade cluster levels; however, instructional materials must meet or exceed all the requirements of the *Sunshine State Standards*. Additionally, these quick lists must not be separated from the vision of rich and varied learning opportunities set forth in the vision statement. Students who are at risk or have learning disabilities may grasp concepts at a slower rate then their chronological peers.

The material in this section is generally consistent with accepted mathematics curriculum across the United States; it is based upon the *Sunshine State Standards for Mathematics* K-8, the *Grade Level Expectations*, and the curriculum summaries in the *New Jersey Mathematics Curriculum Framework* (1996).

Number Sense, Concepts, and Operations

Across the K-8 continuum, students begin with the counting numbers and slowly develop understandings of and proficiency in using zero, the whole numbers, place value, fractions and decimals, negative numbers, integers, the rational number system, irrational numbers, and the real number system. In grades 9-12, they will encounter and use imaginary numbers and expand their understanding to the complex number system. This should be a fascinating and enjoyable journey for teachers and students.

Grades K-2

Due to vast differences in readiness opportunities for kindergarten students and to developmental differences among students across the K-2 grade cluster, this outline should be regarded as a general guideline.

The major topics related to number sense and meaning are:

- whole number meanings through three digits,
- place value and number base,
- counting and grouping.

Whole number meaning includes forming equivalent forms of the same number and comparing and ordering numbers. The place value concept is developed in first grade; understanding increases over subsequent grades.

The major topics in operations are:

- learning the meanings of addition and subtraction,
- gaining competence with basic facts, and
- mastering some computational procedures for multi-digit addition and subtraction.

In addition to mastering paper-and-pencil computational procedures, students should be able to concretely model operations, use mental math, apply simple estimation techniques, and use the calculator in appropriate situations (for example, to use very large numbers). Kindergarten students work primarily with one-digit numbers, first graders with one- and two-digit, and second graders with one- to three-digit numbers. Addition and subtraction basic facts are developed across K-2 and should be mastered before the end of second grade. Two-digit addition and subtraction should be introduced in first grade, and the materials should include a mixture of problems with and without regrouping.

Counting is very important in these grades. Rote counting provides the words and patterns for naming the natural numbers. One-to-one correspondence counting answers the question “How many?” and helps build a sense of number quantity. Counting up builds a foundation for adding; counting back for subtracting; and students should learn to count up and back from a given number. Skip counting up relates to multiplication and skip counting back to division. Counting may also lead to the notion that we can

always go one number higher (a step toward grasping "infinity"). The repeat function on calculators can be used to strengthen number and counting concepts.

Grades 3-5

The major topics regarding number sense and meaning are

- expanding whole number meanings through many digits,
- expanding place value and number base,
- developing the meanings of multiplication and division,
- developing meanings for fractions and decimals, and
- developing meanings for ratio and percent.

In operations, the major topics are

- developing and mastering the multiplication and division basic facts (in grades three and four),
- multi-digit whole number multiplication and division,
- developing meanings for and applying decimal addition, subtraction and multiplication,
- developing meanings for and applying fraction addition, subtraction, and multiplication.

Expanding whole number meanings and developing common fractions and decimals also expand the ideas of equivalence, comparison, and ordering of numbers. Place value understanding is enhanced with experiences with other number bases and with non-place value systems such as those used by the Romans and ancient Egyptians.

Concrete work with varied materials provides the foundation for understanding and working with decimals and fractions. To demonstrate understanding and mastery, students should be able to concretely and pictorially model concepts and operations and to solve problems using computational procedures, mental mathematics, estimation techniques, and the calculator. Teachers should be aware that proportional thinking is anchored in the multiplication concept and intertwined with fraction, ratio, and percent concepts.

Grades 6-8

The major topics at these grades are

- expanding fraction and decimal operations to include division,
- expanding the idea of equivalent numbers,
- building the proportion concept and expanding ratio and percent concepts,
- integer meaning and operations,
- expanding decimal and fraction concepts to the concept of rational numbers, and
- learning the meanings of and using exponents, roots, and scientific notation.

Sixth graders continue to expand their understanding and use of whole numbers, fractions, and decimals; they extend fraction and decimal concepts and operations to include division; and they build an understanding of proportional relationships through the use of concrete examples, tables and graphs.

Seventh graders learn about and use integers, and their understanding is extended to the rational number system. Seventh and eighth graders use exponents, roots, and scientific notation. Proportion is further developed and applied at this level; ratio and percent are closely related to proportion, and applications of percent grow in complexity across these grades. With the introduction of irrational numbers, the number system understanding grows to encompass the real number system

Measurement

Grades K-2

The major concepts that should be developed regarding measurement during these grades are developing and applying:

- direct and indirect measurement techniques and comparisons;
- the idea of a unit of measurement;
- the meaning of and the need for standard units of measure;
- an understanding of some of the properties that are measured, including length, weight, capacity, time, temperature, and money;
- using a personal "referent" that corresponds to a standard measurement unit as in finding a finger width that is about one centimeter;
- connections to other mathematics strands and other content areas; and
- measuring a property to the nearest unit of measurement such as to the nearest cup or inch .

The major activity in acquiring these understandings is actually measuring all sorts of things. Students usually begin by physically comparing objects, such as books, ordering them by length or height or weight and using terms such as taller and shorter, heavy and heaviest, more and less. Usually these are direct (side by side) comparisons but indirect comparisons are often needed, as in asking whether a certain table is higher than another at some distance.

They begin measurement activities by counting the number of units that are needed to measure something. They may count the number of paper clips needed to go across a book or the number of pennies needed to balance a toy dinosaur. Measuring a distance or length with their footsteps may lead them to the need for a consistent measure of a "foot." Measuring instruments are simply a faster way of repeating units of measurement. Whether measuring with nonstandard or standard units or instruments, they should estimate "how many" units will be needed and then check their estimates by actually

measuring. This will develop their "number sense" for the size of units and the approximate number of units required. Second graders should have acquired the idea that measurement is always an approximation to the nearest specified unit.

The time needed to develop these meanings and abilities is greatly dependent upon the developmental level and experiences of the students. The GLEs provide some suggested accomplishments for each grade level.

Grades 3-5

In these grades, students extend their understandings of measurement and exhibit increased connections to other strands. They

- apply the fraction concept in measuring with fractions of units;
- use geometric concepts and manipulatives in developing the concepts of perimeter, area, and volume; and
- extend their understanding of properties that are measured to include angle measures and the notion of speed (distance per time unit).

The understanding of indirect measurement also increases. Students in the fifth grade use concrete exploration to develop formulas for finding perimeter, area, and volumes. The formulas allow them to move beyond direct counting of units.

Grades 6-8

Students continue to progress in the following ways:

- developing and using formulas (indirect measurement) for measuring the area and volume of a wider variety of geometric objects;
- determine the effects of enlarging or decreasing dimensions, i.e., finding the effect on area when dimensions of a rectangle are tripled
- developing wider understanding of the concept of rates
- increased facility with estimation; and
- developing understanding of the "error of measurement."

Estimation techniques are expanded through the use of referents, chunking (breaking the object into parts), and "unitizing" (finding equal parts of the object). Students need to grasp the notion that all measurement is approximate and that the precision of measurement is dependent upon the precision of the instrument used.

Geometry and Spatial Sense

A good description of spatial sense across the K-12 spectrum is found in the New Jersey Mathematics Curriculum Framework (page 209). It reads:

> "Spatial sense is an intuitive feel for shape and space. It involves the concepts of traditional geometry, including an ability to recognize, visualize, represent, and transform geometric shapes. It also involves other, less formal ways of looking at two-and three-dimensional space, such as paper-folding, transformations, tessellations, and projections. Geometry is all around us in art, nature, and the things we make. Students of geometry can apply their spatial sense and knowledge of the properties of shapes and space to the real world. ...Geometry is the study of spatial relationships."

Geometry content should be rich and vital, yet traditional approaches regarded elementary school geometry as an introduction to the basic shapes and high school geometry as a means to understanding and using deductive reasoning. Many elementary teachers have not had rich experiences in elementary geometry and are not comfortable teaching it.

The stages of development of geometric thinking of students with good instruction has been studied and defined by Dutch researchers. These "van Hiele levels" (Geddes and Fortunato (1993) as quoted in the New Jersey Mathematics Curriculum Framework, page 211) are:

- Visual recognition of shapes by their appearances as a whole (level 0)
- Analysis and descriptions of shapes in terms of their properties (level 1)
- Higher "theoretical" levels involving informal deduction (level 2)
- Formal deduction involving axioms and theorems (level 3)
- Work with abstract geometric systems (level 4)

In general, the levels 0 to 3 correspond to the levels of understanding that students exhibit during their K-12 experiences. The degree of "overlap" of stages varies with the development and experiences of the students. Students who enter high school geometry without a strong elementary background are at a great disadvantage.

Grades K-2

- Geometry experiences at this level are chiefly exploratory in nature.

Understanding of spatial relationships involves exploration of objects and their locations in space.

- Students learn geometric concepts and terminology, including symmetry and the names of some plane and solid geometric figures.
- The study of properties begins with sorting and classifying objects.
- Geometric transformations begin with slides and flips of real objects and work with spatial puzzles.
- Coordinate geometry involves maps and games as well as locating points on a number line or coordinate grid.
- Geometric modeling begins with construction activities.
- Geometric understanding is applied in other strands while measuring and ordering objects and while using number lines for counting and locating numbers.
- Reasoning skills are used across these activities.

Grades 3-5

The explorations begun in the primary grades are extended and developed through concrete experiences, including activities involving materials such as tangrams and geoboards. Geometric software programs may also be used. Students:

- recognize and discuss the properties of geometric shapes and begin to make generalizations about shapes;
- explain and illustrate symmetry, congruence, and similarity;
- extend the geometric vocabulary and recognition of geometric entities;
- extend mapping and coordinate location abilities;
- extend geometric modeling through drawing and cutting fractions, drawing geometric figures, and using appropriate software programs: and
- engage in geometric measurement activities such as finding the area of a rectangle.

Grades 6-8

Students at this level continue to use objects, modeling, and computer programs to investigate geometric properties and relationships. Some Florida districts include geometric construction with compass and straight edge at this level. Major topics include:

- identifying the properties and investigating relationships among a wider variety of geometric objects, including the angle relationships in triangles, relationships in congruent and similar triangles, the ratio of circumference to diameter in a circle, simple properties of lines, and the development and application of the Pythagorean Theorem;

- extending reasoning skills to the development and examination of conjectures, testing them with objects, drawings, or computer construction programs, thus developing informal proof techniques;
- extending the study of transformations through tessellations and working in all four quadrants of the coordinate plane;
- extending geometric modeling through drawing and constructing three dimensional figures; using the number line to locate integers, rational numbers, and irrational numbers; and using geometric regions to represent fractions and per cent;
- extending geometric measurement skills; and
- linking geometry to algebra through the graphing of function relationships.

More specific skills for the grade levels are included in the course descriptions and the *Grade Level Expectations*. Content may exceed that described in these documents.

Algebraic Thinking

There are only two *Standards* under this heading in the *Sunshine State Standards*. One of them addresses "patterns, relations, and functions" and the other the use of "expressions, equations, inequalities, graphs, and formulas to represent and interpret situations." The first speaks to a focus on finding and expressing mathematical relationships, and the second to multiple ways to represent such relationships and to find "algebraic" solutions to problems. "Finding a pattern" is one of the problem-solving strategies, and it can be applied to problems in all mathematics strands. Algebraic building blocks that are developed K-8 include using symbols to represent unknown quantities, learning and applying the properties of number operations, evaluating algebraic expressions, and finding solutions to algebraic equations and inequalities.

Algebraic thinking is embedded in and linked to all the other strands. For example, the number concepts and operations strand contains many patterns and relationships. This strand also contains symbols and operations such as powers and exponents and provides the foundation for algebraic sentences and operations. In measurement, there is the search for relationships and the use of symbols to express relationships. In geometry, there is the link through coordinate geometry and through geometric relationships, and in data analysis and probability, there are additional ways and strategies for finding and expressing relationships.

Grades K-2

At this level, students work with patterns, sorting and classifying, and the foundations of variables and equations:

- An instructional goal is to help students see patterns and understand how they help us to make sense of what we see in the world. Students work with concrete objects to identify, continue, and construct patterns. Later they will move to pictorial patterns and to symbolic or abstract patterns using words or numbers. Calculators can be used in the exploration of number patterns.

- Students sort and classify all manner of things, moving through the concrete to pictorial to abstract sequence, and becoming more skilled at explaining why they have chosen to sort or group in a particular way. As they mature, they move from sorting or making patterns using only one attribute to working with two attributes, and they begin to look for rules in the patterns and sorting. Older students may move on to Input-Output games, exploring the results of adding and subtracting.

- Students are introduced to the idea of unknown numbers in number sentences and learn to use a symbol to represent an unknown number. They also discover and use some of the properties of number such as finding that 5 + 3 gives the same result as 3 + 5. They begin to work with simple inequalities such as finding the counting numbers that are less than six.

Grades 3-5

Students expand their understandings of patterns and functions:

- Student patterns become less concrete – moving to more pictorial or abstract objects. Sorting and classifying becomes more complex – using two or more attributes.

- Students are more comfortable with finding the rules but still prefer one-step rules. Rules and input-output games may relate to multiplication and division.

- Fifth graders should begin to form generalizations based upon tables of numbers and expressing the generalization using letters to represent numbers.

- Students develop more properties of number as they learn the multiplication basic facts, such as finding 8 X 7 by finding 8 X 5 and 8 X 2

and adding the products. They also apply the distributive property in developing and using algorithms for two-digit multiplication.

Grades 6-8

During these grades, students use:

- modeling situations and various representations (such as tables and graphs) to show function relationships and develop rules or generalizations using variables. They examine how a change in one variable affects another, as in how a change in dimensions results in a greater change in area or volume.

- patterns and rules in learning topics in geometry and numeration.

- calculators and computers in visualizing patterns and functions and determining rules and algebraic equations that express those relationships.

- concrete materials to develop understanding of algebraic expressions and to solve simple equations and inequalities.

- graphs and calculators to examine the relationships between equations and their graphs, focusing mainly on linear equations but with an introduction to nonlinear relationships.

Data Analysis and Probability

This strand provides the tools for understanding chance and for collecting, organizing and analyzing data. The idea that we analyze data in order to find a pattern and predict future happenings or behavior should be a part of instruction across the K-12 continuum.

These topics lend themselves to experiments, investigations, games, and other active learning. They are essential to assure that students will be able to understand society's use and misuse of statistical data and probability.

Grades K-2

Students at this level:

- collect data and find answers to questions about themselves and their families, such as "How many people are in our families?" They begin graphing with simple bar graphs using objects or pictures and can explain their work.

- experience probability through games with spinners and dice. They learn to use terms such as impossible, probable, and certain. They can predict the most likely outcomes of simple events, such as the probable color of a cube drawn from a bag.

- recognize examples of data analysis and probability in their every day lives and in other subject areas. Older students may use graphing software programs.

Grades 3-5

Students continue to develop understandings based upon explorations of questions that are of interest to them. Games and objects remain very important to understanding. The students:

- extend the analysis of data to include measures of range and central tendency.
- interpret and construct varied types of graphs and arrangements of data.
- discuss uses of data in advertisements and news articles.
- increase their ability to make valid generalizations based on analysis of the data. learn to use computer-generated graphs and spread sheets.
- find the results of compound events, compare the results of experimental and theoretical probability, and use fractions to represent probability outcomes.

Grades 6-8

Work becomes more sophisticated. Students:

- continue to compare the results of experimental and theoretical probabilities and develop a more reasoned understanding of the societal uses and misuses of probability.
- extend their graphing techniques and learn about appropriate sampling techniques.
- design experiments and use appropriate statistical techniques and technology to collect, analyze, and display the resulting data.

Call for Materials for All Students

In an effort to serve all students in Florida, this call for resources is being made on behalf of all students enrolled in Florida's public schools. This includes students with identified disabilities as well as students with diverse learning needs. In attempting to meet the challenge of teaching all students, it is appropriate to remember that "All our students are gifted, and all are at-risk." (This is an anonymous quote recalled from a conference).

The instructional materials that are chosen in the next adoption process must support teachers and students in their efforts to meet the challenges and expectations described previously. It is the goal of this document to identify criteria for instructional materials that will help to assure the best possible mathematics teaching and learning for every student in Florida.

Florida's Call for Inclusion of ESE Students

This adoption addresses the teaching of mathematics to all children. No longer will ESE Mathematics be a separate "call" with a separate adoption and a separate list of materials. That is not to say that all materials will be equally suitable for all children. Florida's State Adoption Committees may, as always, identify some submissions as "especially suitable" for a particular group of students. (Some groups may be reading below grade level or above grade level, may include reluctant readers, or those with specific processing difficulties.) Committee comments appear with adopted titles in the Florida Catalog of Adopted Materials and serve as a guide for teachers or administrators in search of materials. Each State Adoption Committee has at least one member, though usually more than one, who is or has been a certified teacher of ESE students.

Accommodations and Modifications

The following summary of information from the Department of Education guide Accommodations: Assisting Students with Disabilities (1999) is of help in addressing the ways that materials may be developed or changed to meet the needs of students of varied abilities:

Accommodations are changes that can be made in HOW students learn to assure that students with disabilities can participate as fully as possible in the general curriculum. Accommodations:

- do not change achievement expectations.
- are a wide range of techniques and support systems that help students with disabilities work around any limitations that result from their disability. Examples include Braille textbooks or books on tape.
- may be needed by one student but frequently can also help other students in a classroom.
- "are made to the way students learn and how they are tested" (page 2).

  Accommodations may be provided in five general areas:
  - Instructional methods and materials
  - Assignments and classroom assessments
  - Time demands and scheduling
  - Learning environment
  - Use of special communication systems (page 2)

"Modifications are changes that can be made to WHAT students are expected to learn" (page 48). They are used primarily for students who cannot meet the Sunshine State Standards and require a modified curriculum. Modifications change the goals and expectations for students.

Modifications may include:

- partial completion of program or course requirements
- curriculum expectations below age or grade level
- alternate assessment criteria
- alternate curricular goals (page 48)

Comments on 6-8 Courses

Standard and Advanced 6-8 Courses

MJ Mathematics 1, 2, 3. These courses are best described as the standard mathematics courses at grades six, seven, and eight. The advanced versions of these courses are MJ Mathematics 1, 2, 3 Advanced. The course descriptions for the Advanced versions are exactly like the MJ Mathematics 1, 2, 3 except that the Special Note (Section B) indicates that "The district shall develop a description of additional requirements to provide for in-depth or enriched study of the course requirements."

The *Sunshine State Standards* for grade cluster 6-8 express the goals of the *Standards* for students upon completion of the eighth grade. The content for the adopted materials for the standard and advanced middle grades mathematics courses should include and may go beyond the intent of the *Standards*.

Additional guidelines for content exist in the *Grade Level Expectations*. In some instances the content of the GLEs goes beyond the content of the course descriptions for MJ Mathematics 1, 2, 3. This is due to the fact that the GLEs are intended to challenge all students, including the most mathematically able.

Neither the course descriptions nor the *Grade Level Expectations* are intended to hinder the adoption of 6-8 series that do not conform precisely to either the course descriptions or the *Grade Level Expectations*. The primary goal is the *Sunshine State Standards*. Publishers are asked to demonstrate that over the course of the three year series, the content required by the *Standards* and indicated in the course descriptions and GLEs is provided. They should also demonstrate that all strands are addressed at all grade levels and that material that is addressed and presumably mastered at one grade level will be applied in subsequent courses at a sufficient level to assure student retention of the material. (See the information regarding required Correlations in the Content section of this document.)

Remedial and ESE Courses

Mathematics: 6-8 is an Exceptional Student Education course. The course description for this course is highly detailed and descriptive. Some of the materials developed for this course may also be used in Academic Skills: 6-8, a course that contains a mathematics component but is not exclusively a mathematics course.

M/J Intensive Mathematics. This is a remedial course for students who are struggling with some aspect of mathematics. Intensive Mathematics may be the only math course for the student or it may be a course that is offered in addition to another middle grades mathematics course. It might be used as a remedial course for students who have low scores on the FCAT or some other test. The course may be offered in summer school, and it may be repeated as many times as needed. The course description indicates that the course should be designed to meet the needs of the enrolled students; it is also the responsibility of the school or teacher to determine the *Sunshine State Standards* and Benchmarks that are addressed by the particular course. This course may well be one of the most challenging for publishers.

Students in Intensive Mathematics and ESE courses at the middle grades level may need help with some major topic(s) from the elementary grades. Frequently, their major needs lie in a lack of understanding of concepts that support specific skills. These courses should not be paper-and-pencil drill courses. The course content should be directed toward active, hands-on learning and the development of problem-solving abilities. All content strands should be addressed with due attention to the connecting of the strands. If the primary need is in the number strand, then some needs may best be met through the integration of number into the other strands. Unfortunately, many of these students may have had limited opportunities to work in strands other than number; if so, they may have mathematical abilities that have never been discovered. Meeting specific needs in any strand begins with determining where the student's understanding really lies. Students should use manipulatives, calculators, computers, and other technology. Although some of the students may be functioning at a lower grade level, they will need materials that are set in a context that is appealing for middle grades students. These are the students who most need excellent and engaging materials and excellent instruction. Their teachers may need assistance with the diagnosis and correction of mathematics difficulties.

Special Note

Please note that students in grades 6-8 may enroll in mathematics courses for grades 9-12. The three courses most commonly used are Pre-Algebra, Algebra I or Algebra I Honors, and Geometry or Geometry Honors.

Sources for The Florida Perspective

Florida Department of Education Documents:

- *Accommodations: Assisting Students With Disabilities, A Guide for Educators*, 1999. Available at the DOE Homepage (www.firn.edu/doe/commhome/).

- *FCAT Mathematics Test Item and Performance Task Specifications*, 2001. Available on the DOE Homepage (www.firn.edu/doe/sas/fcat.htm).

- *Florida Course Descriptions*, varying years. Available on the DOE Homepage (www.firn.edu/doe). Descriptions for called courses are in Appendix A.

- *Florida Curriculum Framework Mathematics*, 1996. Available at minimal charge through the Curriculum Support Section, 850 488 1701.

- *Florida Sunshine State Standards Mathematics*, 1996. Available at the DOE Homepage (www.firn.edu/doe). The *Standard*s are in Appendix A.

- *Grade Level Expectations for the Sunshine State Standards, Mathematics*, 1999. Available on the DOE Homepage (www.firn.edu/doe) under *Sunshine State Standards*. The cluster version contains the *Standards* and Benchmarks as well as the GLEs. The cluster version is in Appendix A.

- *Sunshine State Standards for Special Diploma: Exceptional Student Education – Florida Curriculum Framework*, 1999. Available at the DOE Homepage (www.firn.edu/doe/commhome) under Publications.

- Geddes, Dorothy, & Fortunato, Irene. "Geometry: Research and Classroom Activities," in D. T. Owens, Ed., *Research Ideas for the Classroom: Middle Grades Mathematics*. New York: Macmillan, 1993. Quoted in *New Jersey Mathematics Curriculum Framework*.

National Council of Teachers of Mathematics. *Principles and Standards for School Mathematics*, 2000. Available at (www.nctm.org).

New Jersey Mathematics Coalition and the New Jersey Department of Education. *New Jersey Mathematics Curriculum Framework*, 1996. Available at (dimacs.rutgers.edu/nj_math_coalition/framework.html).

✓ Publishers' Submissions

Florida will accept for consideration bids configured as follows:

Elementary Mathematics Grades K-5

- **Elementary Mathematics Series, K-5**

Middle/Junior Mathematics Grades 6-8

- **M/J Mathematics Series 1, 2, 3**
- **M/J Mathematics Advanced Series 1, 2, 3**
- **M/J Intensive Mathematics**
- **Mathematics: 6-8**

Major Priorities for Instructional Materials

The priorities as described in this specifications 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

FLORIDA STATUTES

233.165(1)(b)—KEY WORDS: educational purpose… performance standards… instructional objectives… curriculum frameworks

233.25(3)(b)—KEY WORDS: written correlations… curricular objectives… performance standards

233.09(4)—KEY WORDS: curricular objectives… performance standards

233.09(4)(g)— KEY WORDS: independent investigation

233.061(1)—KEY WORDS: adopted standards

Content must align with the state's standards for the subject, grade level, and learning outcomes.

For grades K-8, the content must include and be aligned with the *Sunshine State Standards* for the subject area of Mathematics. Additionally, for grades 6-8, the content must align with the specific course descriptions included in Appendix A.

The *Sunshine State Standards* are arranged by content strands and in grade clusters, K-2, 3-5, 6-8, and 9-12. Each standard contains more specific Benchmarks. The *Sunshine State Standards* are approved by the State Board of Education, and, by Florida statute, instruction for the *Standards* must be provided by Florida's public school districts. These *Standards* are included in Appendix A of this document. They can be accessed in cluster format at the Department of Education Homepage (www.firn.edu/doe/curric).

For grades 6-8, instructional materials must also be aligned with the Florida course descriptions. (Note that the Course Descriptions were previously called Curriculum Frameworks.) The course descriptions for all "called" courses appear in Appendix A and may also be accessed through the DOE Homepage. The course descriptions for 6-8 courses include either the related *Sunshine State Standards* or the related *Sunshine State Standards* for Special Diploma.

Florida has also developed *Grade Level Expectations* (GLEs) for mathematics in grades K-8 to better define reasonable goals toward the *Standards* at all grade levels. The GLEs are essentially a consensus document based upon similar documents previously developed by Florida districts and in other states. They are recommended by the Florida Department of Education and have been used as a resource document for the development of the *FCAT Mathematics Performance Tasks and Item Specifications* for grades 3-10.

However, the GLEs did not require the approval of the State Board of Education, and they are not mandated for instruction. Districts may choose to teach specific topics at different grade levels than those specified in the GLEs. The GLEs are intended to assist the districts in their curriculum planning and articulation; they are not intended to interfere with that planning or with the selection of instructional materials that may include a different progression toward the *Standards* and Benchmarks for grades 2, 5, and 8. Many Florida districts are using the GLEs. The GLEs appear in Appendix A with their associated *Standards* and Benchmarks. They may be accessed through the DOE Homepage (Sunshine State Standards).

Correlations. Publishers are **required** to provide correlation reports in the form of charts, tables, or lists to show exactly where and to what extent (mentioned or in-depth) the instructional materials cover **the materials described above. For grades K-8, submissions must include correlations to the *Sunshine State Standards* and their associated Benchmarks and to the *Grade Level Expectations*. As noted above, the materials are not required to rigidly correlate, grade by grade, with the *Grade Level Expectations*.**

It is highly recommended (but not required) that submissions for grades K-8 also be correlated to the standards addressed in the *Principles and Standards for School Mathematics*, published by the National Council of Teachers of Mathematics (NCTM) in 2000. The *Principles and Standards* identifies ten standards. Five are content standards with names almost identical to the strands in Florida's *Sunshine State Standards*. NCTM's "process" standards are: Problem Solving, Reasoning and Proof, Communication, Connections, and Representation. All of these are integrated into the *Sunshine State Standards* to some degree, with a particular emphasis on problem solving. Correlations to the process standards would be particularly helpful to Florida educators.

For grades K-8, correlations to the *Sunshine State Standards*, the *Grade Level Expectations*, and, if provided, standards from the *Principles and Standards* must be provided in the ancillary materials so that each teacher will be able to trace the growth of the particular concept. Some districts appreciate a

reference to the specific *Sunshine State Standards* and/or Benchmark(s) in the text chapters or activities.

NRT Correlations - Many Florida teachers would value correlations to the content listings for the norm-referenced test currently used statewide. (As of June, 2001, that test is Stanford 9 for grades 3-10.) Therefore, publishers are encouraged, but not required, to submit correlations to the content listings for the norm-referenced test(s) currently used statewide in Florida at the time programs are submitted for consideration.

For grades 6-8, correlations must also be provided to the content outcomes and related *Sunshine State Standards* and Benchmarks or *Sunshine State Standards for Special Diploma* as described in the specific course descriptions in Appendix A.

If content presentation for a 6-8 series varies from the outline presented in the course descriptions, those variations should be duly noted. For example, a topic that appears in a seventh grade course description may be introduced at sixth or eighth grades in some series. In such cases, correlations to the course descriptions may be considered across the three-grade series. Publishers are asked to demonstrate that over the course of the three year series, the content required by the *Standards* and indicated in the course descriptions and GLEs is provided. They should also demonstrate that all strands are addressed at all grade levels and that material that is addressed and presumably mastered at one grade level will be applied in subsequent courses at a sufficient level to assure student retention of the material. State Board of Education Rules permit districts to omit up to 10% of the course content as described in the course description; districts may add content as they wish.

Correlations. Publishers are expected to provide correlation reports in the form of charts, tables, or lists to show exactly where and to what extent (mentioned or in-depth) the instructional materials cover each required standard.

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 grade level expectations.

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.

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. **In the elementary grades, varied materials and activities should be sufficient for up to one hour of mathematics instruction per day; the materials and activities should be adaptable to varying periods of time since the instructional time for mathematics may be separated during the day. In grades 6-8, many Florida schools use a schedule that provides 90 minute blocks of teaching time. Activities that help teachers use a variety of teaching strategies and team or group work are needed in such situations.**

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORD: suitable

233.165(1)(a)—KEY WORDS: the age of the children

233.165(1)(c) —KEY WORDS: the degree to which the material would be supplemented or explained

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.

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, court decisions, diaries, autobiographies, artifacts, or historical sites. The type of sources considered appropriate will vary with the particular subject area.

D. ACCURACY OF CONTENT

FLORIDA STATUTES

233.25(9)—KEY WORDS: free from all errors

233.09(4)(e)—KEY WORDS: accurate, objective

Content must be accurate in historical context and contemporary facts and concepts.

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 truths, major concepts, standards, and models of the profession or 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.

E. CURRENTNESS OF CONTENT

FLORIDA STATUTES

233.09(4)(e)—KEY WORD: current

233.25(9)—KEY WORD: up-to-date

Content must be up-to-date for the academic discipline and the context in which the content is presented.

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. In fact, second or third editions may or may not reflect more up-to-date information than first editions. Informed examination of the text, narrative, and visuals contained in the materials provides the most direct information about currentness of the materials. **In mathematics, the content of the major tool and supportive materials should also reflect the current NCTM *Principles and Standards for School Mathematics*, published in 2000.**

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.

F. AUTHENTICITY

Content should include problem-centered connections to life in a context that is meaningful to students.

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. Connections may include hopes and dreams, choices and activities. **In mathematics, while it is essential that instructional materials make numerous connections to students' life situations, it is not essential that all activities have such connections. It is also essential to include content,**

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils

233.09(4)(b)—KEY WORDS: humankind's place in ecological systems… conservation…dangerous substances

233.061(2)(e)—KEY WORDS: civil government… functions and interrelationships

233.061(2)(i)—KEY WORDS: effects…upon the human body and mind

233.09(4)(b)—KEY WORDS: conservation of natural resources

investigations, and reflections that are purely mathematical and highly engaging for students.

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 use collateral learning from other disciplines rather than isolated knowledge or skills
- the focus on common themes across several subject areas (infusion, parallel, transdisciplinary, or multidisciplinary instruction)

Connections within mathematics. In mathematics, instructional materials should also explicitly build and identify connections that exist within the various strands of mathematics. For example, consider students who are using concrete objects to derive a formula describing the relationship that exists between the dimensions of a cylinder and its volume. They are engaging in a measurement activity. They are using algebraic thinking to reveal and express the relationship, and the resulting formula is an algebraic equation. The activity requires spatial visualization, pertains to a geometric object, and uses geometry terminology. The activity may also involve organizing and analyzing data based upon measurement, and, of course, number sense and operations are involved.

Activities in a particular strand should involve material from other strands. Review and test questions should also combine content from multiple strands.

G. MULTICULTURAL REPRESENTATION

Portrayal of gender, ethnicity, age, work situations, and various social groups must include multicultural fairness and advocacy.

Multicultural fairness. 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.

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.

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.

233.061(2)(g)(o)(p)—KEY WORDS: contributions of African Americans…Hispanic contributions… women's contributions

233.07(1)(a) and 233.16(1)(c)1.—KEY WORDS: address the broad racial, ethnic, socioeconomic, and cultural diversity of the student population

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. **Mathematics provides abundant opportunities for multicultural links. Possibilities include historical connections and mathematical puzzles and games. For example, the mathematics we use today has contributions from all continents and peoples. Our numeral system is called the Hindu-Arabic system. The numerals, the zero concept, and the place-value system were invented by the Hindus and transmitted to northern Africa and Europe by Arabic traders and scholars. In Italy, the system eventually replaced the Roman numeral system and has been passed on to us.**

H. HUMANITY AND COMPASSION

FLORIDA STATUTES

233.061(2)(f)—KEY WORDS: to be a responsible and respectful person

233.061(2)(j)—KEY WORDS: kindness to animals

233.09(4)(c)—KEY WORDS: humane treatment of people and animals

233.165(1)(a)—KEY WORDS: age of the children

233.165(2)—KEY WORD: pornography

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.

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.

REFERENCES FOR CONTENT FEATURES

For a complete list of references and citations, please refer to **Destination: Florida Classrooms—Evaluator's Handbook,** *or request a list of references from the Department of Education, Bureau of Curriculum, Instruction, and Assessment.*

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

FLORIDA STATUTES

233.16(2)—KEY WORDS: suitable, usable

233.165(1)(c)—KEY WORDS: the degree to which the material would be supplemented or explained

Resources must be complete enough to address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course.

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, review and practice activities, and projects.

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

Student resources. Student materials typically include the major text or program with text or narration, visuals, assignments, and assessments. Formats may include print, audio, visual, digitized or computer-based, or other media.

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 simulations, role-playing situations, investigations, and hands-on practice assignments. Review activities might include self-checks or quizzes. Formats might include 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. **Many Florida teachers stress that practice activities for procedural objectives such as the multiplication of fractions or the application of the Pythagorean Theorem should contain sufficient examples to meet the varying needs of students. Additional practice materials may be included in an Appendix or in ancillary 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.

All of the findings listed above are essential to appropriate instructional materials for Florida students. In addition, the following are required with the goal of better meeting the needs of all students:

- **Student resources must include sufficient examples to represent the levels of rigor associated with the topic and with the related student exercises.**
- **Student materials, other than the major tool, must be copy- or print-ready. In addition, publishers are required to provide CD or web-accessible materials that can be downloaded and modified to meet the needs of the individual teacher or student.**

- **Student resources must include materials that are designed for student discovery or construction of concepts and are appropriate for labs, centers, individual or cooperative group work. These materials should be aimed at a variety of learning styles.**

- **The major tool and other materials must include activities that use manipulatives and technology, such as calculators, software programs, and websites, in engaging and appropriate ways.**

- **Student resources must include challenging and engaging problems, such as a problem of the week, that will require persistence over a period of time. Such problems allow time for reflection and thinking and for insight to occur.**

- **The major tool and other student materials must be consistent with the problem-solving focus of the *Sunshine State Standards*. Additionally, material consistent with the focus and format of the *Florida Comprehensive Assessment Test* must be embedded within the materials. Appropriate materials include activities and problems that address more than one mathematics strand; problems that are embedded in varied content areas; open-ended questions that require students to reflect upon, demonstrate, and explain their work (either orally or in writing); instruction in the use and/or construction of rubrics for grading performance tasks; creative tasks such as drawing models or constructing graphs; and multiple-choice questions that demand higher cognitive level thinking. In general, these attributes are not inconsistent with excellent instructional materials. The materials should be a natural part of the content presentation and should not be labeled as FCAT preparation materials.**

  Specific FCAT preparation materials are not required. Should a publisher choose to offer such optional materials, they must be consistent with the *Sunshine State Standards* and correlated with the *FCAT Mathematics Test Item and Performance Task Specifications*. (These are available through the DOE Homepage.)

- **In mathematics classes, there are often students who are unable to read at the readability level of the mathematics**

materials. The language of mathematics is extremely challenging for poor readers because of the density of the complex language. Here density refers to the ratio of complex works to the total number of words in a reading passage. For these students, ancillary materials should include materials that have been written with simpler sentence structure and easier vocabulary, and that include more visuals.

To assist all students in reading and understanding mathematics terminology, the morphology of mathematical terms should be included in the major tool to teach the meaning of the "morphemes" that are the building blocks of the mathematical terms as they are being introduced or addressed. For example, the word "geometry" consists of "geo" which means "earth" and "metry" which is related to "measure." Thus, the word "geometry" literally means "earth measure;" of course, the meaning of the word has expanded over the centuries, but analysis of the morphemes leads to connections to "geology" and "geography" and to "meter" and "metric" and, most importantly, helps the students to infer the meanings of new words that they may encounter that contain the same or similar morphemes. Such analysis may also be helpful to non-English speaking students whose first languages use Greek or Latin roots that are used in many mathematics terms. (Vocabulary dictionaries that define roots, prefixes, and suffixes may be of help with this task.)

Teacher resources. Teacher materials typically include a teacher's edition with the annotated student text and copies of supplementary written materials with answer keys, worksheets, tests, diagrams, etc., so that the teacher has to use only one guide. Publishers may make available inservice training, workshops, or consulting services to support teachers in implementing instructional materials. **Such professional development services are usually essential to the success of a mathematics program, particularly a program with non-traditional elements. Publishers should clearly indicate the recommended amount and types of professional development that are needed and work with districts and schools to assure that teachers receive**

the support that they need. Furthermore, materials for the teacher should aim at supporting continued teacher learning.

Answer keys should also support teachers by including answers to all exercises and providing solution strategies/explanations for selected items that span the level of difficulty in the exercise set.

Support, guidelines, resources, or features such as the ones described below help teachers to effectively implement materials in classroom and school settings.

- **Components and materials that 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; correct specifications for making media and electronic programs work effectively. **Ease of use is a primary factor in the requirement that student materials be copy- or print-ready and that they be easily modified to meet teacher and student needs.**

- **Materials to 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, and other extension activities; suggestions for integrating themes across the subject area or course curriculum and forming connections to other disciplines; suggestions for parental and community involvement; cultural highlights to explain and expand on the materials. **In mathematics, the sequence of specific topics or chapters is sometimes flexible. For example, data analysis techniques and some geometry topics could be done at any time. Suggestions for alternative sequences and/or "stand alone" topics would be helpful. In general, it is best to begin the instructional year with a fresh and engaging topic, not a review session.**

A related need is for materials to support on-going learning centers in the classroom, for example, to continue geometry exploration and problem-solving activities while addressing measurement as the current topic of instruction; this may mean the simple identification of materials that can be used in this manner.

Suggestions for adapting instruction for varying needs: Examples include alternative teaching approaches such as pacing, and options for varied delivery of instruction such as media, tools, equipment, and emerging technology such as digital media and electronic tools; strategies for engaging all students, such as open-ended questions to stimulate thinking, journals, manipulatives, explorations, and multisensory approaches; suggestions for addressing common student difficulties or adapting to multiple learning styles; and alternative reteaching, enrichment, and remediation strategies. **The mathematics teacher's guide should include a discussion of common errors and misunderstandings and ways to prevent or correct them, plus observation or questioning techniques that will help the teacher assess student understanding. Assessment materials should include varied print-ready assessments for different reading levels and a variety of learning styles.**

Guidelines and resources on how to implement and evaluate instruction: Examples include answers to work assignments, practice activities, and tests; possible outcomes of projects or research; suggestions for using learning tasks for classroom assessment; guidelines for alternative assessments, such as sample checklists, peer or performance assessments, portfolios, or projects. **All of these are extremely important in mathematics instruction.**

Resources to use in classroom activities: Examples include copy masters to use for displays or photocopies;

bibliographies or lists of resources and references, including network resources; classroom management strategies and documentation on the manageability of the entire instructional program; in-service workshop or consultation support from the publisher. **Again, all these are important in mathematics instruction.**

B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS

All components of an instructional package must align with each other, as well as with the curriculum.

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, master copies of handouts in a teacher's edition should align with student activities or assignments. They must match in content and progression of instructional activities.

FLORIDA STATUTE

233.07(4)—KEY WORDS: instructional materials… major tool…instruction of a subject or course

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.

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; menu or map 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;

FLORIDA STATUTES

233.16(2)—KEY WORD: usable

233.165—KEY WORD: degree to which the material would be supplemented and explained

introductions, key concepts and themes, visual cues, illustrations, labeled examples, and labeled reviews or summaries.

Visible structure and format. Other at-a-glance features signal the organization of content, such as 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. **In mathematics, the concrete to abstract development is extremely important; it is equally as important that the content presentation effectively link the two. Often such a link is effected through teacher talk and the intermediary steps of drawing pictures and using number sentences to record the actions with manipulatives.**

The organization of presentation of a particular topic in mathematics is very dependent upon the nature of the material. There are some topics that need to be introduced with direct, explicit instruction, and others that need to be built upon classroom recall and mapping of previous learning. There are others that are perfect for student investigations that will allow students to have the thrill of discovery. Reflective

questions embedded in or following such investigations will help students and teachers consider what they have learned and how it relates to other mathematics topics or to other content disciplines.

D. READABILITY OF INSTRUCTIONAL MATERIALS

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable, desirable

233.165(1)(a)—KEY WORDS: the age of the children

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.

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, which avoid both choppy sentences and unnecessary words
- 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

- 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
- colors, size of print, spacing, quantity, and type of visuals suitable for the abilities and needs of the intended students

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORD: suitable

233.165(1)(a)—KEY WORDS: the age of the children

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.

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.

FLORIDA STATUTES

233.07(4)—KEY WORDS: instructional materials… major tool…instruction

233.25(3)(a)—KEY WORDS: specifications of the physical characteristics

233.16(2)—KEY WORDS: suitable, usable, desirable

233.165(1)(a)—KEY WORDS: the age of the children

233.165(1)(c)—KEY WORDS: the degree to which the material would be supplemented or explained

233.25(6)—KEY WORDS: not to exceed the lowest price

233.25(7)(8)(9)(10)—KEY WORDS: reduce automatically…free of charge…equal in quality…supplementary…

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.

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 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, CD-ROMs, Internet sites, and transparencies may serve instructional purposes well, but have little value unless they can be implemented with the school's equipment. Sometimes, a publisher provides training, inservice, or 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 Department of Education Commissioner 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.

REFERENCES FOR PRESENTATION FEATURES

For a complete list of references and citations, please refer to **Destination: Florida Classrooms—Evaluator's Handbook,** *or request a list of references from the Department of Education, Bureau of Curriculum, Instruction, and Assessment.*

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.

Expectations. Materials should positively influence the expectations of students. Examples include:

- positive expectations for success
- novel tasks or other approaches to arouse 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, puzzles, controversies, and questioning of traditional ways of thinking

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable, desirable

233.165(1)(a)—KEY WORDS: the age of the children

233.25(5)—KEY WORDS: diagnostic, criterion-referenced

- 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
- 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
- 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"

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable

233.165(1)(b)—KEY WORDS: educational purpose

Instructional materials should thoroughly teach a few important ideas, concepts, or themes.

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

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable

233.165(1)(b)—KEY WORDS: educational purpose

Instructional materials must contain clear statements of information and outcomes.

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 notetaking, 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. **In mathematics, there is sometimes confusion about such words as "similar" which has a more specific meaning in geometry than in everyday life or "base" which has multiple meanings in mathematics and in daily life. These terms cannot be avoided; thus the different meanings need to be discussed and explained.**

D. GUIDANCE AND SUPPORT

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable, desirable

Instructional materials must include guidance and support to help students safely and successfully become more independent learners and thinkers.

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 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
  (1) condensed outlines or overviews
  (2) simplified views of information
  (3) visual representations of new information during initial instruction
  (4) sample problems
  (5) questions to focus on key ideas or important features
  (6) examples of solved problems
  (7) explanations of how the problems were solved
  (8) examples of finished products or sample performances
  (9) 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
- 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 overgeneralize 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
  (1) structured and unstructured activities
  (2) independent and group work
  (3) teacher-directed and discovery learning

(4) visual and narrative instruction
(5) hands-on activities
(6) open-ended activities
(7) practice without extrinsic rewards or grades
(8) simple, complex, concrete, and abstract examples
(9) variable pacing or visual breaks

- a variety of *modalities* for the various multiple intelligences of students, such as
  (1) linguistic-verbal
  (2) logical-mathematical
  (3) musical
  (4) spatial
  (5) bodily-kinesthetic
  (6) interpersonal
  (7) intrapersonal

E. ACTIVE PARTICIPATION OF STUDENTS

Instructional materials must engage the physical and mental activity of students during the learning process.

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 the types of activities listed below.

- 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

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable, desirable

233.165(1)(a)—KEY WORDS: the age of the children

- choose from a variety of activities

For mathematics instruction, this list is rich in ways to increase communication and creativity in the classroom. The choice of a variety of activities is important in helping students to assume responsibility for themselves and their own learning.

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable, desirable

233.165(1)(a)—KEY WORDS: the age of the children

233.061(2) KEY WORDS: approved methods of instruction

233.061(2) KEY WORDS: approved methods of instruction

F. TARGETED INSTRUCTIONAL STRATEGIES

Instructional materials should include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements.

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, but 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. **To extend the problem-solving example in mathematics, if the instructional topic is problem-solving strategies, each of the strategies should be taught and practiced with a set of problems that are particularly conducive to that strategy. Thus the "work backward" or "draw a picture" strategies would each be presented with problems that can be solved with that strategy. However, it is also necessary to provide a mixed set of problems that contains some problems that can be solved with multiple strategies. Further reference to strategies and opportunities to solve varied problem sets should occur frequently in subsequent material.**

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 have 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

- ***To teach* Attitudes*—for example, helping students to believe that they can learn mathematics***
    - Explain and show consequences of choices, actions, or behaviors.
    - Provide relevant human or social models that portray the desired choices, actions, or behaviors

  In mathematics, students must be enticed by engaging activities and reassured by success. Materials and teachers must deliver the message that mathematics is accessible to all students.

- **To teach** *Cognitive Strategies* (learning how to learn)**—for example, self-monitoring and reflecting upon the effectiveness of the problem-solving strategy selected and used**

- Encourage or teach (a) organizing and summarizing information; (b) self-questioning, self-reflection, and self-evaluation; and (c) reference skills.
- Encourage or teach when and how to use these different skills.

- **To teach** *Comprehension/Understanding***—for example, comprehending and understanding information in a mathematics reading selection**
  - Outline, explain, or visually show what will be learned in a simple form.
  - Explain with concrete examples, metaphors, questions, or visual representations.
  - Require students to relate new to previously learned information.
  - Require students to paraphrase or summarize new information.
  - Require students to construct a visual representation of main ideas (map, table, diagram, etc.).
  - Give students opportunities to add details, explanations, or examples to basic information.
  - Require application of knowledge or information.

- **To teach** *Concepts***—for example, learning the properties of similar geometric figures.**
  - Provide clear definition of each concept.
  - Point out important and unimportant features or ideas.
  - Point out examples and non-examples of the concept, showing similarities and differences.
  - Include practice in classifying concepts.
  - Include a wide range of examples in progressive presentation of more complex examples.
  - Emphasize relationships between concepts.

  In mathematics, the examples should be as concrete as possible, and, whenever possible, students should investigate examples and non-examples, identify the attributes or properties of the concept, and help to form the definition.

- **To teach** *Creativity***—for example, using varied problem-solving approaches or creating models for mathematical relationships**
  - 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 changing perceptions.
- Encourage brainstorming.
- Include questions and problems with multiple answers.
- Provide opportunities of ungraded, unevaluated creative performance and behavior.

In mathematics, creativity is shown in activities such as creating graphs, writing problems, or applying computer programs to investigate geometric relationships.

- **To teach** *Critical Thinking*—**for example, judging whether an answer is reasonable or determining the validity of explanations**
  - 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 v. irrelevant issues, contradictions, "buggy" algorithms, and predictions.
  - Provide practice in drawing inferences from observations and making predictions from limited information.
  - Explain and provide practice in recognizing factors that 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 judgments and how and why present judgments differ from previous ones.

In mathematics, critical thinking is exhibited in many ways. For example students estimate reasonable answers, explain and demonstrate the meanings of number sentences or operations, explain how they reached solutions, justify their work, use deductive reasoning in proof, develop rules for relationships (such as finding the area of plane figures), and make and check the validity of conjectures.

- **To teach** *Insight*—**for example, seeing and explaining that there is no "highest" number as they count or noting the connections between the "Battleship" game, coordinate geometry, and latitude and longitude readings.**

    - Include inquiry and discovery activities.
    - Provide challenging thinking situations with concrete data to manipulate.
    - Promote careful observation, analysis, description, and definition.

    In mathematics, insight can be modeled through presenting stories of mathematicians who exhibited insightful thinking. For example, the young Gauss discovered a rule for finding the sum of all the whole numbers, 1 to 100. Insight may also be encouraged by teachers and materials that value varied problem-solving approaches and unique solutions or connections.

- **To teach** *Metacognition* (learning how to think)**—for example, rereading and self-correcting written explanations of problem solving**
    - Explain different types of thinking strategies and when to use them.
    - Encourage self-evaluation and reflection.
    - Include questions to get 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.

- **To teach** *Motor Skills***—for example, using measurement or electronic tools proficiently**
    - Provide a mental and physical model of desired performance.
    - Describe steps in the performance.
    - Provide practice with kinesthetic and corrective feedback (coaching).

- **To teach** *Multiple Intelligences***—for example, student groups plan and present as they choose the results of their research, investigation, or problem solving**
    - 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.

Active learning of mathematics should incorporate all the intelligences identified above. For example, committing basic facts to memory can be enhanced by movement and song. Physical interaction with objects, games, the environment, and interactive computer programs are all essential to understanding in mathematics.

- **To teach** *Problem Solving*—**for example, forming predictions, inferences, logical endings, or conclusions**
  - 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.
  - Include drill and practice to improve speed, consistency, and ease of using problem-solving steps.

- **To teach** *Procedural Knowledge, Principles, and Rules***—for example, procedures for constructing graphs or performing a division algorithm**
-
    - Define context, problems, situations, or goals for which procedures are appropriate.
    - 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.
- **To teach** *Scientific Inquiry***—for example, transferring information gathered and recorded into a formal presentation**
    - Explain process and methods of scientific inquiry.
    - Explain and provide examples of (a) typical solution procedures, (b) how to form hypotheses, (c) how to speculate, and (d) how to identify and interpret consequences.
    - Encourage independent thinking and avoidance of dead ends or simplistic answers.
    - Require students to explain experiences with inquiry activities and results of inquiry activities.
- **To teach** *Thinking Skills* (also refer to critical thinking and metacognitive skills)**—for example, comparing and contrasting numeric and algebraic sentences**
    - 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.

- **To teach** *Verbal Information, Knowledge, or Facts***—for example, new mathematics vocabulary**
  - Provide a meaningful context to link new information and past and/or future 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.
  - Include some overlearning and mastery through practice in rehearsal, recall, or restatement of information (refer to *comprehension*).
  - Point out parts, main ideas, pattern, or relationships within information or sets of facts.

G. TARGETED ASSESSMENT STRATEGIES

FLORIDA STATUTES

233.09(4)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

233.16(2)—KEY WORDS: suitable, usable, desirable

233.165(1)(a)—KEY WORDS: the age of the children

233.25(5)—KEY WORDS: diagnostic, criterion-referenced

Instructional materials should include assessment strategies that are known to be successful in determining how well students have achieved the targeted learning outcomes.

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 requirements required by the targeted learner outcomes. 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. **Similarly, in mathematics, asking the student to recall a basic fact in multiplication does not assess whether the student understands the operation of multiplication or whether the student can apply the operation to a problem.**

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

- **To assess** *Attitudes:*
  - Provide various situations.
  - Require choices about behaviors.
- **To 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.
- **To 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.
- **To assess** *Concepts:*
  - Provide new examples and non-examples.
  - Require identification or classification into the correct categories.

- **To assess** *Creativity:*
  - Provide new problems to "turn upside down," study, or resolve—these could be puzzles, dance performances, drama performances, or products to create.
  - Require products or solutions to fit within the particular functions and resources.
  - Provide situations requiring novel approaches.
- **To assess** *Critical Thinking:*
  - Require students to evaluate information or results.
  - Require the use of analysis and research.
- **To assess** *Insight:*
  - Provide situations for inquiry and discovery.
  - Provide situations for manipulation.
- **To assess** *Metacognition* (learning how to think):
  - Provide different situations or problems.
  - Require students to identify types of thinking strategies to analyze and evaluate their own thinking.
- **To assess** *Multiple Intelligences:*
  - Provide situations in the modality that is targeted, e.g., verbal-linguistic, musical, or other modality.
  - Provide situations in several modalities, to allow choice
  - Require performance in the targeted or chosen modalities.
- **To assess** *Motor Skills:*
  - Provide situations and resources for performance of the skill.
  - Include checklist for evaluation.
- **To 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.
- **To 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 ones to apply in different situations.
- Provide situations that require students to demonstrate the correct use of procedures, principles, or rules with routine problems.

- **To assess** *Scientific Inquiry:*
  - Provide situations or problems that require speculation, inquiry, and hypothesis formation.
  - Provide research, hands-on activity, and conclusions.

- **To assess** *Thinking Skills* (also refer to critical thinking and metacognitive 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- v. closed-mindedness.
  - Require students to detect instances of responsible v. irresponsible and accurate v. 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.

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

REFERENCES FOR LEARNING FEATURES

For a complete list of references and citations, please refer to **Destination: Florida Classrooms—Evaluator's Handbook,** or request a list of references from the Department of Education, Bureau of Curriculum, Instruction, and Assessment.

Criteria for Evaluation of Instructional Materials

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. What follows is the evaluation instrument used by adoption committee members. Evaluators will use the following 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.

STATE COMMITTEE EVALUATION FORM

DIRECTIONS: *Use this form along with the criteria in the instructional materials specifications to independently review each submission.*

As part of your independent review for each of the criteria, rate and comment on how well the submission satisfies the requirements. Possible ratings are as follows: ■ THOROUGHLY, ■ HIGHLY, ■ ADEQUATELY, ■ MINIMALLY, *or* ■ NOT AT ALL .

At your state committee meeting, you will discuss your review and agree on the summary of RATINGS, COMMENTS, and the OVERALL EVALUATION for each submission. Your committee will then VOTE for or against adoption and will make suggestions for notations to include in the Florida Catalog of Instructional Materials. *Your committee's decisions will appear on one Committee Consensus Questionnaire.*

IDENTIFICATION OF SUBMISSION
Subject Area Committee
Course for Which Recommended
Name of Publisher
Title of Submission

CONTENT

A. ALIGNMENT WITH CURRICULUM REQUIREMENTS

Content aligns with the state's standards for the subject, grade level, and learning outcomes.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

CORRELATIONS_____

SCOPE_____

COMPLETENESS _____

B. LEVEL OF TREATMENT OF CONTENT

The level of complexity or difficulty of content is appropriate for the standards, student abilities and grade level, and time periods allowed for teaching.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

OBJECTIVES_____

STUDENTS_____

TIME_____

C. EXPERTISE FOR CONTENT DEVELOPMENT

Expertise in the content area and in education of the intended students are reflected in the authors, reviewers, and sources that contributed to development of the materials.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

AUTHORSHIP_____

SOURCES _____

D. ACCURACY OF CONTENT

Content is accurate in historical context and contemporary facts and concepts.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

OBJECTIVITY_____

REPRESENTATIVENESS_____

CORRECTNESS_____

E. CURRENTNESS OF CONTENT

Content is up-to-date for the academic discipline and the context in which the content is presented.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

DATES OR EDITIONS_____

CONTEXT_____

INFORMATION_____

F. AUTHENTICITY OF CONTENT

Content includes problem-centered connections to life in a context that is meaningful to students.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

LIFE CONNECTIONS_____

INTERDISCIPLINARY TREATMENT_____

G. MULTICULTURAL REPRESENTATION

Portrayal of gender, ethnicity, age, work situations, and social groups includes multicultural fairness and advocacy.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

MULTICULTURAL FAIRNESS_____

MULTICULTURAL ADVOCACY_____

H. HUMANITY AND COMPASSION

Portrayal of the appropriate care and treatment of people and animals includes compassion, sympathy, and consideration of their needs and values and excludes hard-core pornography and inhumane treatment.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

INCLUSION OF COMPASSION_____

EXCLUSION OF INHUMANITY _____

SUMMARY ANALYSIS FOR CONTENT

In general, how well does the submission satisfy *CONTENT* requirements?

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

PRESENTATION

A. COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES

Resources are complete enough to address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

STUDENT RESOURCES_____

TEACHER RESOURCES_____

B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS

All components of an instructional package align with each other, as well as with the curriculum.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issue? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

ALIGNMENT_____

C. ORGANIZATION OF INSTRUCTIONAL MATERIALS

The structure and format of materials have enough order and clarity to allow students and teachers to access content and explicitly identify ideas and sequences.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

ACCESS TO CONTENT_____

VISIBLE STRUCTURE AND FORMAT_____

LOGICAL ORGANIZATION_____

D. READABILITY OF INSTRUCTIONAL MATERIALS

Narrative and visuals will engage students in reading or listening as well as understanding of the content.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

LANGUAGE STYLE_____

VISUAL FEATURES_____

E. PACING OF CONTENT

The amount or content presented at one time or the pace at which it is presented is of a size or rate that allows students to perceive and understand it.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issue? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

PACING_____

F. EASE OF USE OF MATERIALS

Both print and other media formats of instructional materials are easy to use and replace and are durable enough for multiple uses over time.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

WARRANTY_____

USE_____

DURABILITY_____

SUMMARY ANALYSIS FOR PRESENTATION

In general, how well does the submission satisfy *PRESENTATION* requirements?

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

LEARNING

A. MOTIVATIONAL STRATEGIES

Instructional materials include features to maintain learner motivation.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

EXPECTATIONS_____

FEEDBACK_____

APPEARANCE_____

B. TEACHING A FEW "BIG IDEAS"

Instructional materials thoroughly teach a few important ideas, concepts, or themes.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

FOCUS_____

COMPLETENESS_____

C. EXPLICIT INSTRUCTION

Instructional materials contain clear statements of information and outcomes.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

CLARITY OF DIRECTIONS AND EXPLANATIONS_____

EXCLUSIONS OF AMBIGUITY_____

D. GUIDANCE AND SUPPORT

Instructional materials include guidance and support to help students safely and successfully become more independent learners and thinkers.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

LEVEL_____

ADAPTABILITY_____

E. ACTIVE PARTICIPATION OF STUDENTS

Instructional materials will engage the physical and mental activity of students during the learning process.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

ASSIGNMENTS_____

STUDENT RESPONSES_____

F. TARGETED INSTRUCTIONAL STRATEGIES

Instructional materials include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

ALIGNMENT_____

COMPLETENESS_____

G. TARGETED ASSESSMENT STRATEGIES

Instructional materials include assessment strategies known to be successful in determining how well students have achieved learning outcomes targeted in the curriculum requirements.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

ALIGNMENT_____

COMPLETENESS_____

SUMMARY ANALYSIS FOR LEARNING

In general, how well does the submission satisfy *LEARNING* requirements?

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

OVERALL EVALUATION

1. If given responsibility for teaching the course, would you choose these materials for classroom use?

❑ **YES** ❑ **NO**

2. What notations do you think should be included in the Catalog?

_____ _____

Committee Member Signature **Date**

Sunshine State Standards
Mathematics

Introduction

The Sunshine State Standards identify what Florida public school students should know and be able to during each of four grade clusters that represent developmental levels: PreK-2, 3-5, 6-8, 9-12. They describe the student achievement that the state will hold schools accountable for students learning in the subject areas of language arts, mathematics, science, social studies, music, visual arts, theatre, dance, health, physical education, and foreign languages.

The Sunshine State Standards will affect many aspects of schooling in Florida. The curriculum and instruction--what teachers teach and how they teach it--must be organized around these standards. The state will be assessing reading, writing, and mathematics based on the standards. At the local level, once the state standards have been implemented, then classroom tests should be geared to those standards. Finally, the systems used to report student progress--report cards and transcripts--should have a clear relationship to the standards. In short, the standards should be the starting point for much that is done within Florida's educational system.

The Sunshine State Standards are organized as follows:

> **Strand** = label (word or short phrase) for a category of knowledge, such as reading, writing, measurement, economics, nature of matter.
>
> > **Standard** = general statement of expected learner achievement within the strand.
> >
> > > **Benchmark** = learner expectations (what a student should know and be able to do to achieve the standard) at the end of the developmental levels of grades PreK-2, 3-5, 6-8, 9-12.

A strand is the most general type of information. A **strand** is a short label for a category of knowledge under which standards are subsumed. This helps organize the vast amount of information to be learned in a subject area. Each of the strands contains one or more standards. A **standard** is a description of general expectations regarding knowledge and skill development within a strand. The most specific level of information is the **benchmark**. A benchmark is a statement of expectations about student knowledge and skill at the end of one of four developmental levels: grades PreK-2, 3-5, 6-8, and 9-12. Benchmarks translate the general standards into expectations at different levels of student development. Within a standard, one would expect high school students to be performing differently from primary students. The benchmarks describe these differing levels of expectations.

It is expected that several benchmarks might often be combined into a single teaching or assessment activity. The listing of separate benchmarks does not mean that students must demonstrate achievement of them one at a time.

Expectations of student knowledge and skills are described in the standards, but the standards are also written with some assumptions regarding student learning. Although the knowledge and skills stated at an earlier level of schooling might not be repeated in the benchmarks at later levels, they remain important and should be reinforced and even re-taught, if necessary. It is also assumed that in meeting the expectations described in these benchmarks, students are working with material that is appropriate with regard to their ages, developmental levels, and grade levels.

For easy reference, the table of standards and benchmarks uses an identification system that mirrors the structure of the standards' organization. Each strand, standard, and benchmark has been assigned a unique identification code. The first two letters of the code identify the subject area, (e.g., LA for language arts, MA for mathematics; SC for science; SS for social studies; HE for health education; PE for physical education; FL for foreign languages; and in the arts, MU for music, VA for visual arts, TH for theatre, and DA for dance). The third letter identifies the strand. The number in the fourth slot identifies the general standard under the strand. The number in the fifth position identifies the developmental level, as in 1 = grades PreK-2, 2 = grades 3-5, 3 = grades 6-8, and 4 = grades 9-12. The last digit numbers the benchmarks under the grade cluster within the standard.

The Sunshine State Standards identify the essential knowledge and skills that students should learn and for which the state will hold schools accountable. Nevertheless, how the standards and benchmarks are organized within a specific curriculum, how they are taught within learning activities, what instructional strategies and materials are used to teach them, how much time is spent teaching them, and when they are taught within the developmental levels are local decisions.

A. Number Sense, Concepts, and Operations

1. The student understands the different ways numbers are represented and used in the real world.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.A.1.1.1 associates verbal names, written word names, and standard numerals with the whole numbers less than 1000.
	MA.A.1.1.2 understands the relative size of whole numbers between 0 and 1000.
	MA.A.1.1.3 uses objects to represent whole numbers or commonly used fractions and relates these numbers to real-world situations.
	MA.A.1.1.4 understands that whole numbers can be represented in a variety of equivalent forms.
Grades 3-5	MA.A.1.2.1 names whole numbers combining 3-digit numeration (hundreds, tens, ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents.
	MA.A.1.2.2 understands the relative size of whole numbers, commonly used fractions, decimals, and percents.
	MA.A.1.2.3 understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations.
	MA.A.1.2.4 understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents.
Grades 6-8	MA.A.1.3.1 associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.
	MA.A.1.3.2 understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

A. Number Sense, Concepts, and Operations

1. The student understands the different ways numbers are represented and used in the real world.	
Level	**Benchmark** **The student**
Grades 6-8	MA.A.1.3.3 understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.
	MA.A.1.3.4 understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value.
Grades 9-12	MA.A.1.4.1 associates verbal names, written word names, and standard numerals with integers, rational numbers, irrational numbers, real numbers, and complex numbers.
	MA.A.1.4.2 understands the relative size of integers, rational numbers, irrational numbers, and real numbers.
	MA.A.1.4.3 understands concrete and symbolic representations of real and complex numbers in real-world situations.
	MA.A.1.4.4 understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, absolute value, and logarithms.

A. Number Sense, Concepts, and Operations

2. The student understands number systems.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.A.2.1.1 understands and applies the concepts of counting (by 2s, 3s, 5s, 10s, 25s, 50s), grouping, and place value with whole numbers between 0 and 100.
	MA.A.2.1.2 uses number patterns and the relationships among counting, grouping, and place value strategies to demonstrate an understanding of the whole number system.
Grades 3-5	MA.A.2.2.1 uses place-value concepts of grouping based upon powers of ten (thousandths, hundredths, tenths, ones, tens, hundreds, thousands) within the decimal number system.
	MA.A.2.2.2 recognizes and compares the decimal number system to the structure of other number systems such as the Roman numeral system or bases other than ten.
Grades 6-8	MA.A.2.3.1 understands and uses exponential and scientific notation.
	MA.A.2.3.2 understands the structure of number systems other than the decimal number system.
Grades 9-12	MA.A.2.4.1 understands and uses the basic concepts of limits and infinity.
	MA.A.2.4.2 understands and uses the real number system.
	MA.A.2.4.3 understands the structure of the complex number system.

A. Number Sense, Concepts, and Operations

3. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.A.3.1.1 understands and explains the effects of addition and subtraction on whole numbers, including the inverse (opposite) relationship of the two operations.
	MA.A.3.1.2 selects the appropriate operation to solve specific problems involving addition and subtraction of whole numbers.
	MA.A.3.1.3 adds and subtracts whole numbers to solve real-world problems using appropriate methods of computing, such as objects, mental mathematics, paper and pencil, calculator.
Grades 3-5	MA.A.3.2.1 understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division.
	MA.A.3.2.2 selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers.
	MA.A.3.2.3 adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

A. Number Sense, Concepts, and Operations

3. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.	
Level	**Benchmark** **The student**
Grades 6-8	MA.A.3.3.1 understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers.
	MA.A.3.3.2 selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.
	MA.A.3.3.3 adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.
Grades 9-12	MA.A.3.4.1 understands and explains the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships.
	MA.A.3.4.2 selects and justifies alternative strategies, such as using properties of numbers, including inverse, identity, distributive, associative, transitive, that allow operational shortcuts for computational procedures in real-world or mathematical problems.
	MA.A.3.4.3 adds, subtracts, multiplies, and divides real numbers, including square roots and exponents, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

A. Number Sense, Concepts, and Operations

4. The student uses estimation in problem solving and computation.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.A.4.1.1 provides and justifies estimates for real-world quantities.
Grades 3-5	MA.A.4.2.1 uses and justifies different estimation strategies in a real-world problem situation and determines the reasonableness of results of calculations in a given problem situation.
Grades 6-8	MA.A.4.3.1 uses estimation strategies to predict results and to check the reasonableness of results.
Grades 9-12	MA.A.4.4.1 uses estimation strategies in complex situations to predict results and to check the reasonableness of results.

5. The student understands and applies theories related to numbers.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.A.5.1.1 classifies and models numbers as even or odd.
Grades 3-5	MA.A.5.2.1 understands and applies basic number theory concepts, including primes, composites, factors, and multiples.
Grades 6-8	MA.A.5.3.1 uses concepts about numbers, including primes, factors, and multiples, to build number sequences.
Grades 9-12	MA.A.5.4.1 applies special number relationships such as sequences and series to real-world problems.

B. Measurement

1. The student measures quantities in the real world and uses the measures to solve problems.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.B.1.1.1 uses and describes basic measurement concepts including length, weight, digital and analog time, temperature, and capacity.
	MA.B.1.1.2 uses standard customary and metric (centimeter, inch) and nonstandard units, such as links or blocks, in measuring real quantities.
Grades 3-5	MA.B.1.2.1 uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight, time, temperature, perimeter, area, volume, and angle.
	MA.B.1.2.2 solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.
Grades 6-8	MA.B.1.3.1 uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids and cylinders.
	MA.B.1.3.2 uses concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.
	MA.B.1.3.3 understands and describes how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume.
	MA.B.1.3.4 constructs, interprets, and uses scale drawings such as those based on number lines and maps to solve real-world problems.

B. Measurement

1. The student measures quantities in the real world and uses the measures to solve problems.

Level	Benchmark **The student**
Grades 9-12	MA.B.1.4.1 uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids, cylinders, cones, and pyramids.
	MA.B.1.4.2 uses concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, and arc lengths.
	MA.B.1.4.3 relates the concepts of measurement to similarity and proportionality in real-world situations.

2. The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).

Level	Benchmark **The student**
Grades PreK-2	MA.B.2.1.1 uses direct (measured) and indirect (not measured) comparisons to order objects according to some measurable characteristics (length, weight).
	MA.B.2.1.2 understands the need for a uniform unit of measure to communicate in real-world situations.
Grades 3-5	MA.B.2.2.1 uses direct (measured) and indirect (not measured) measures to calculate and compare measurable characteristics.
	MA.B.2.2.2 selects and uses appropriate standard and nonstandard units of measurement, according to type and size.
Grades 6-8	MA.B.2.3.1 uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.
	MA.B.2.3.2 solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system.
Grades 9-12	MA.B.2.4.1 selects and uses direct (measured) or indirect (not measured) methods of measurement as appropriate.

B. Measurement

2. The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).	
Level	**Benchmark** **The student**
	MA.B.2.4.2 solves real-world problems involving rated measures (miles per hour, feet per second).

3. The student estimates measurements in real-world problem situations.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.B.3.1.1 using a variety of strategies, estimates lengths, widths, time intervals, and money and compares them to actual measurements.
Grades 3-5	MA.B.3.2.1 solves real-world problems involving estimates of measurements, including length, time, weight, temperature, money, perimeter, area, and volume.
Grades 6-8	MA.B.3.3.1 solves real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume, in either customary or metric units.
Grades 9-12	MA.B.3.4.1 solves real-world and mathematical problems involving estimates of measurements, including length, time, weight/mass, temperature, money, perimeter, area, and volume, and estimates the effects of measurement errors on calculations.

B. Measurement

4. The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.B.4.1.1 selects and uses an object to serve as a unit of measure, such as a paper clip, eraser, or marble.
	MA.B.4.1.2 selects and uses appropriate instruments, such as scales, rulers, clocks, and technology to measure within customary or metric systems.
Grades 3-5	MA.B.4.2.1 determines which units of measurement, such as seconds, square inches, dollars per tankful, to use with answers to real-world problems.
	MA.B.4.2.2 selects and uses appropriate instruments and technology, including scales, rulers, thermometers, measuring cups, protractors, and gauges, to measure in real-world situations.
Grades 6-8	MA.B.4.3.1 selects appropriate units of measurement and determines and applies significant digits in a real-world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement.)
	MA.B.4.3.2 selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.
Grades 9-12	MA.B.4.4.1 determines the level of accuracy and precision, including absolute and relative errors or tolerance, required in real-world measurement situations.
	MA.B.4.4.2 selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.

D. Algebraic Thinking

1. The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.C.1.1.1 understands and describes the characteristics of basic two- and three-dimensional shapes.
Grades 3-5	MA.C.1.2.1 given a verbal description, draws and/or models two- and three-dimensional shapes and uses appropriate geometric vocabulary to write a description of a figure or a picture composed of geometric figures.
Grades 6-8	MA.C.1.3.1 understands the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions.
Grades 9-12	MA.C.1.4.1 uses properties and relationships of geometric shapes to construct formal and informal proofs.

2. The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.C.2.1.1 understands basic concepts of spatial relationships, symmetry, and reflections.
	MA.C.2.1.2 uses objects to perform geometric transformations, including flips, slides, and turns.
Grades 3-5	MA.C.2.2.1 understands the concepts of spatial relationships, symmetry, reflections, congruency, and similarity.
	MA.C.2.2.2 predicts**,** illustrates, and verifies which figures could result from a flip, slide, or turn of a given figure.
Grades 6-8	MA.C.2.3.1 understands the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.
	MA.C.2.3.2 predicts and verifies patterns involving tessellations (a covering of a plane with congruent copies of the same pattern with no holes and no overlaps, like floor tiles).

D. Algebraic Thinking

2. The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.

Level	Benchmark **The student**
Grades 9-12	MA.C.2.4.1 understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals.
	MA.C.2.4.2 analyzes and applies geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure).

3. The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically.

Level	Benchmark **The student**
Grades PreK-2	MA.C.3.1.1 uses real-life experiences and physical materials to describe, classify, compare, and sort geometric figures, including squares, rectangles, triangles, circles, cubes, rectangular solids, spheres, pyramids, cylinders, and prisms, according to the number of faces, edges, bases, and corners.
	MA.C.3.1.2 plots and identifies positive whole numbers on a number line.
Grades 3-5	MA.C.3.2.1 represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems.
	MA.C.3.2.2 identifies and plots positive ordered pairs (whole numbers) in a rectangular coordinate system (graph).
Grades 6-8	MA.C.3.3.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems.
	MA.C.3.3.2 identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines.
Grades 9-12	MA.C.3.4.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry.
	MA.C.3.4.2 using a rectangular coordinate system (graph), applies and algebraically verifies

D. Algebraic Thinking

3. The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically.	
Level	**Benchmark** **The student**
	properties of two- and three-dimensional figures, including distance, midpoint, slope, parallelism, and perpendicularity.

1. The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.D.1.1.1 describes a wide variety of classification schemes and patterns related to physical characteristics and sensory attributes, such as rhythm, sound, shapes, colors, numbers, similar objects, similar events.
	MA.D.1.1.2 recognizes, extends, generalizes, and creates a wide variety of patterns and relationships using symbols and objects.
Grades 3-5	MA.D.1.2.1 describes a wide variety of patterns and relationships through models, such as manipulatives, tables, graphs, rules using algebraic symbols.
	MA.D.1.2.2 generalizes a pattern, relation, or function to explain how a change in one quantity results in a change in another.
Grades 6-8	MA.D.1.3.1 describes a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, equations, and inequalities.
	MA.D.1.3.2 creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.
Grades 9-12	MA.D.1.4.1 describes, analyzes, and generalizes relationships, patterns, and functions using words, symbols, variables, tables, and graphs.
	MA.D.1.4.2 determines the impact when changing parameters of given functions.

D. Algebraic Thinking

2. The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.D.2.1.1 understands that geometric symbols (○,□, Δ) can be used to represent unknown quantities in expressions, equations, and inequalities.
	MA.D.2.1.2 uses informal methods to solve real world problems requiring simple equations that contain one variable.
Grades 3-5	MA.D.2.2.1 represents a given simple problem situation using diagrams, models, and symbolic expressions translated from verbal phrases, or verbal phrases translated from symbolic expressions, etc.
	MA.D.2.2.2 uses informal methods, such as physical models and graphs to solve real-world problems involving equations and inequalities.
Grades 6-8	MA.D.2.3.1 represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities.
	MA.D.2.3.2 uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.
Grades 9-12	MA.D.2.4.1 represents real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.
	MA.D.2.4.2 uses systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices.

E. Data Analysis and Probability

1. The student understands and uses the tools of data analysis for managing information.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.E.1.1.1 displays solutions to problems by generating, collecting, organizing, and analyzing data using simple graphs and charts.
	MA.E.1.1.2 displays data in a simple model to use the concepts of range, median, and mode.
	MA.E.1.1.3 analyzes real-world data by surveying a sample space and predicting the generalization onto a larger population through the use of appropriate technology, including calculators and computers.
Grades 3-5	MA.E.1.2.1 solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts.
	MA.E.1.2.2 determines range, mean, median, and mode from sets of data.
	MA.E.1.2.3 analyzes real-world data to recognize patterns and relationships of the measures of central tendency using tables, charts, histograms, bar graphs, line graphs, pictographs, and circle graphs generated by appropriate technology, including calculators and computers.
Grades 6-8	MA.E.1.3.1 collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, bar graphs, to determine how different ways of presenting data can lead to different interpretations.
	MA.E.1.3.2 understands and applies the concepts of range and central tendency (mean, median, and mode).
	MA.E.1.3.3 analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.

E. Data Analysis and Probability

1. The student understands and uses the tools of data analysis for managing information.	
Level	**Benchmark** **The student**
Grades 9-12	MA.E.1.4.1 interprets data that has been collected, organized, and displayed in charts, tables, and plots.
	MA.E.1.4.2 calculates measures of central tendency (mean, median, and mode) and dispersion (range, standard deviation, and variance) for complex sets of data and determines the most meaningful measure to describe the data.
	MA.E.1.4.3 analyzes real-world data and makes predictions of larger populations by applying formulas to calculate measures of central tendency and dispersion using the sample population data, and using appropriate technology, including calculators and computers.

2. The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.E.2.1.1 understands basic concepts of chance and probability.
	MA.E.2.1.2 predicts which simple event is more likely, equally likely, or less likely to occur.
Grades 3-5	MA.E.2.2.1 uses models, such as tree diagrams, to display possible outcomes and to predict events.
	MA.E.2.2.2 predicts the likelihood of simple events occurring.
Grades 6-8	MA.E.2.3.1 compares experimental results with mathematical expectations of probabilities.
	MA.E.2.3.2 determines odds for and odds against a given situation.
Grades 9-12	MA.E.2.4.1 determines probabilities using counting procedures, tables, tree diagrams, and formulas for permutations and combinations.
	MA.E.2.4.2 determines the probability for simple and compound events as well as independent and dependent events.

E. Data Analysis and Probability

3. The student uses statistical methods to make inferences and valid arguments about real-world situations.	
Level	**Benchmark** **The student**
Grades PreK-2	MA.E.3.1.1 designs a simple experiment to answer a class question, collects appropriate information, and interprets the results using graphical displays of information, such as line graphs, pictographs, and charts.
	MA.E.3.1.2 decides what information is appropriate and how data can be collected, displayed, and interpreted to answer relevant questions.
Grades 3-5	MA.E.3.2.1 designs experiments to answer class or personal questions, collects information, and interprets the results using statistics (range, mean, median, and mode) and pictographs, charts, bar graphs, circle graphs, and line graphs.
	MA.E.3.2.2 uses statistical data about life situations to make predictions and justifies reasoning.
Grades 6-8	MA.E.3.3.1 formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts.
	MA.E.3.3.2 identifies the common uses and misuses of probability and statistical analysis in the everyday world.
Grades 9-12	MA.E.3.4.1 designs and performs real-world statistical experiments that involve more than one variable, then analyzes results and reports findings.
	MA.E.3.4.2 explains the limitations of using statistical techniques and data in making inferences and valid arguments.

Grade Level Expectations for the Sunshine State Standards

Mathematics
Grades K-8

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Strand A: Number Sense, Concepts, and Operations
Standard 1: The student understands the different ways numbers are represented and used in the real world.

Benchmark MA.A.1.1.1: The student associates verbal names, written word names, and standard numerals with the whole numbers less than 1000.

Grade Level Expectations
The student:

Kindergarten

1. counts up to 10 or more objects using verbal names and one-to-one correspondence.
2. reads and writes numerals to 10 or more.
3. counts orally to 100 or more.
4. knows that cardinal numbers indicate quantity and ordinal numbers indicate position.

First Grade

1. uses one-to one correspondence to count objects to 100 or more.
2. reads and writes numerals to 100 or more.
3. uses ordinal numbers 1^{st} - 10^{th} or higher.

Second Grade

1. reads and writes numerals to 1000 or more.
2. reads and writes number words to "twenty" or higher.
3. understands and uses ordinal numbers 1^{st} - 100^{th} or higher.

Benchmark MA.A.1.1.2: The student understands the relative size of whole numbers between 0 and 1000.

Grade Level Expectations
The student:

Kindergarten

1. uses numbers and pictures to describe how many objects are in a set (to 10 or more).
2. uses language such as *before* or *after* to describe relative position in a sequence of whole numbers on a number line up to 10 or more (for example, 4 is before 5, 5 is after 4).
3. compares two or more sets (up to 10 objects in each set) and identifies which set is equal to, more than, or less than the other.

First Grade

1. compares and orders whole numbers to 100 or more using concrete materials, drawings, number lines, and symbols (<, =, >).
2. compares two or more sets (up to 100 objects in each set) and identifies which set is equal to, more than, or less than the other.

Second Grade

1. compares and orders whole numbers to 1000 or more using concrete materials, drawings, number lines, and symbols (<, =, >).
2. compares two or more numbers, to 1000 or more, and identifies which number is more than, equal to, or less than the other number.

Benchmark MA.A.1.1.3: The student uses objects to represent whole numbers or commonly used fractions and relates these numbers to real-world situations.

Grade Level Expectations
The student:

Kindergarten

1. uses sets of concrete materials to represent quantities, to 10 or more, given in verbal or written form.
2. uses concrete materials to represent fractional parts of a whole (one half, one fourth).

First Grade

1. represents real-world applications of whole numbers, to 100 or more, using concrete materials, drawings, and symbols.
2. represents and explains fractions (one half, one fourth, three fourths) as part of a whole and part of a set using concrete materials and drawings.
3. uses concrete materials to compare fractions in real-life situations (for example, pizzas, cookies).
4. knows that the total of equivalent fractional parts makes a whole (for example, two halves equal one whole).

Second Grade

1. represents real-world applications of whole numbers, to 1000 or more, using concrete materials, drawings, and symbols.
2. represents, compares, and explains halves, thirds, quarters, and eighths as part of a whole and part of a set, using concrete materials and drawings.
3. uses concrete materials to compare fractions in real-life situations.
4. knows that the total of equivalent fractional parts makes a whole (for example, eight eighths equal one whole).

Benchmark MA.A.1.1.4: The student understands that whole numbers can be represented in a variety of equivalent forms.

Grade Level Expectations
The student:

Kindergarten

1. represents equivalent forms of the same number, up to 10 or more, through the use of concrete materials (for example, using unifix cubes, 5 can be represented as 1+4, 2+3, 0+5; five pennies equal one nickel and ten pennies equal one dime).

First Grade

1. represents equivalent forms of the same number, up to 20 or more, through the use of concrete materials (including coins), diagrams, and number expressions (for example, 16 can be represented as 8+8, 10+6, 4+4+4+4, 20-4, 17-1).

Second Grade

1. represents equivalent forms of the same number through the use of concrete materials (including coins), diagrams, and number expressions.

Standard 2: The student understands number systems.

Benchmark MA.A.2.1.1: The student understands and applies the concepts of counting (by 2s, 3s, 5s, 10s, 25s, 50s), grouping, and place value with whole numbers between 0 and 100.

Grade Level Expectations
The student:

Kindergarten

1. with teacher direction, counts orally to 100 or more by 2s, 5s, and 10s using a hundred chart or concrete materials.
2. uses concrete materials, pictures, and numerals to show the concept of numbers to 10 or more.
3. counts backward from ten to one.

First Grade

1. counts orally to 100 or more by 2s, 5s, and 10s with or without a hundred chart.
2. uses concrete materials, pictures, and symbols to show the grouping and place value of numbers to 100 or more.
3. counts forward and backward by one beginning with any number less than 100.

4. counts forward by tens from any number less than 10 using a hundred chart.

Second Grade

1. counts to 1000 or more by 2s, 3s, 5s, 10s, 25s, 50s and 100s using a variety of ways, such as mental mathematics, paper and pencil, hundred chart, calculator, and coins in various increments.
2. demonstrates the place value groupings of numbers to 1000 or more using concrete materials, pictures, and symbols.
3. counts by tens from any given number less than 1000.
4. counts forward or backward by one beginning with any number less than 1000.
5. counts coins using "mixed" counting (using coin values of 50, 25, 10, 5, and 1).

Benchmark MA.A.2.1.2: The student uses number patterns and the relationships among counting, grouping, and place value strategies to demonstrate an understanding of the whole number system.

Grade Level Expectations
The student:

Kindergarten

1. groups objects in sets of 2 or more.
2. knows the relationships between larger numbers and smaller numbers.

First Grade

1. counts and groups 11 or more objects into tens and ones (for example, 3 groups of ten and 4 more is 34 or 30+4).
2. knows place value patterns and uses zero as a place holder (for example, trading 10 ones for 1 ten).
3. knows the place value of a designated digit in whole numbers to 100.

Second Grade

1. counts and groups objects into hundreds, tens, and ones, and relates the groupings to the corresponding written numeral (for example, 4 groups of 100, 2 groups of ten, and 6 ones is 426).
2. knows place value patterns using zero as a place holder (for example, trading 10 tens for 100).
3. knows the place value of a designated digit in whole numbers to 1000.

Standard 3: The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.

Benchmark MA.A.3.1.1: The student understands and explains the effects of addition and subtraction on whole numbers, including the inverse (opposite) relationship of the two operations.

Grade Level Expectations
The student:

Kindergarten

1. demonstrates and describes the effect of putting together and taking apart sets of objects (for example, 3 cubes and 4 cubes is 7 cubes).
2. uses a number line to demonstrate how to count up and count back from a given number.

First Grade

1. demonstrates knowledge of the meaning of addition (putting together, increasing) and subtraction (taking away, comparing, finding the difference) using manipulatives, drawings, symbols, and story problems.
2. solves basic addition facts using concrete objects and thinking strategies, such as count on, count back, doubles, doubles plus one, and make ten.
3. describes the related facts that represent a given fact family up to 18 (for example, 9+3=12, 12-9=3, 12-3=9).
4. knows how to use the commutative and associative properties of addition in solving problems and basic facts.
5. adds and subtracts two-digit numbers without regrouping (sums to 100) using models, concrete materials, or algorithms.

Second Grade

1. recalls (from memory) the addition facts and corresponding subtraction facts.
2. knows the related facts that represent the inverse relationships between addition and subtraction.
3. predicts the relative size of solutions in addition and subtraction (for example, adding two whole numbers results in a number that is larger than either of the two original numbers).
4. adds and subtracts two-digit numbers with or without regrouping using models, concrete materials, and algorithms.

5. demonstrates knowledge of multiplication (for the repeated addition and array models) using manipulatives, drawings, and story problems.
6. demonstrates knowledge of division (for the repeated subtraction and partitive models) using manipulatives, drawings, and story problems.

Benchmark MA.A.3.1.2: The student selects the appropriate operation to solve specific problems involving addition and subtraction of whole numbers.

Grade Level Expectations
The student:

Kindergarten

1. creates and acts out number stories using objects.
2. knows strategies for solving number problems.

First Grade

1. poses and solves simple number problems by selecting the proper operation (for example, finding how many students are sitting at tables one and two).
2. uses concrete objects to solve number problems with one operation.
3. describes thinking when solving number problems.
4. writes number sentences associated with addition and subtraction situations.

Second Grade

1. solves problems involving addition and subtraction using a variety of strategies (such as drawings, role playing, and working backward) and explains the solution strategy.
2. writes and solves number problems with one operation involving addition or subtraction.
3. writes number sentences associated with addition and subtraction situations.
4. creates and acts out (using objects) number stories representing multiplication and division situations.

Benchmark MA.A.3.1.3: The student adds and subtracts whole numbers to solve real-world problems, using appropriate methods of computing, such as objects, mental mathematics, paper and pencil, calculator.

Grade Level Expectations
The student:

Kindergarten

1. demonstrates an awareness of addition and subtraction in everyday activities (using concrete objects, models, drawings, role playing).

First Grade

1. knows appropriate methods (for example, concrete materials, mental mathematics, paper and pencil) to solve real-world problems involving addition and subtraction.
2. uses a calculator to explore addition, subtraction, and skip counting.

Second Grade

1. knows appropriate methods (for example, concrete materials, mental mathematics, paper and pencil, calculator) to solve real-world problems involving addition and subtraction.
2. chooses and explains the computing method that is more appropriate (that is faster, more accurate, easier) for varied real-world tasks (for example, recall of basic facts is faster than using a calculator whereas recording data from survey results may be easier with a calculator).

Standard 4: The student uses estimation in problem solving and computation.

Benchmark MA.A.4.1.1: The student provides and justifies estimates for real-world quantities.

Grade Level Expectations
The student:

Kindergarten

1. estimates and verifies by counting sets that have more, fewer, or the same number of objects (for example, using a reference set of objects, comparing cards with different numbers of dots, estimating whether sets are more or less than a given number such as five).

First Grade

1. uses the language of estimation and approximation to identify and describe numbers in real-world situations (for example, about, near, closer to, between).
2. estimates the number of objects, explains the reasoning for the estimate, and checks the reasonableness of the estimate by counting.
3. makes reasonable estimates when comparing larger or smaller quantities.
4. estimates reasonable answers to basic facts (e.g., Will 7+8 be more than 10?).

Second Grade

1. makes predictions of quantities of objects (to 50 or more) and explains the reasoning supporting that prediction (for example, the number of pieces of candy in a large jar may be estimated by finding the number of pieces in a small jar and estimating how many small jars would fill the larger one).

2. estimates reasonable solutions for addition and subtraction problems (sums to 100) and explains the procedure used (for example, the sum of 34 and 57 is more than 80 since 30 + 50 is 80).
3. knows reasonable and unreasonable estimates.

Standard 5: The student understands and applies theories related to numbers.

Benchmark MA.A.5.1.1: The student classifies and models numbers as even or odd.

Grade Level Expectations
The student:

Kindergarten

1. uses concrete objects to explore odd and even numbers (up to 10).

First Grade

1. demonstrates and builds models to show the difference between odd and even numbers using concrete objects or drawings.

Second Grade

1. demonstrates and explains the difference between odd and even numbers using concrete objects or drawings.
2. identifies and explains odd and even numbers.

Strand B: Measurement
Standard 1: The student measures quantities in the real world and uses the measures to solve problems.

Benchmark MA.B.1.1.1: The student uses and describes basic measurement concepts including length, weight, digital and analog time, temperature, and capacity.

Grade Level Expectations
The student:

Kindergarten

1. knows how to communicate measurement concepts.
2. measures length of objects and distance using nonstandard concrete materials.
3. weighs objects to explore concepts of heavier and lighter.
4. describes concepts of time (for example, before or after, day or night).
5. describes concepts of temperature (for example, hot or cold).

6. compares and demonstrates the concept of capacity (for example, full or empty).

First Grade

1. knows how to communicate measurement concepts.
2. demonstrates an understanding of measurement of lengths by selecting appropriate units of measurement (for example, inches or feet).
3. demonstrates an understanding of weight by selecting appropriate units of measurement (for example, grams or kilograms).
4. demonstrates an understanding of time using digital and analog clocks (for example, hour and half-hour intervals).
5. demonstrates an understanding of temperature by using thermometers.
6. demonstrates an understanding of capacity by selecting appropriate units of measurement (for example, cups, pints, quarts, liters).

Second Grade

1. knows how to communicate measurement concepts.
2. demonstrates an understanding of customary and metric measurement of length and distance, selecting appropriate units of measurement (for example, inches, feet, yards, centimeters, meters).
3. demonstrates an understanding of customary and metric measurement of weight by selecting appropriate units of measurement (for example, ounces, pounds, grams, kilograms).
4. demonstrates an understanding of time using digital and analog clocks (for example, quarter-hour, five-minute intervals).
5. demonstrates an understanding of temperatures by using Fahrenheit and Celsius thermometers.
6. demonstrates an understanding of capacity by using appropriate units of measurement (for example, ounces, cups, pints, quarts, gallons, liters, milliliters).

Benchmark MA.B.1.1.2: The student uses standard customary and metric (centimeter, inch) and nonstandard units, such as links or blocks, in measuring real quantities.

Grade Level Expectations
The student:

Kindergarten

1. uses nonstandard objects, such as cubes, marbles, paper clips, and pencils, to measure classroom objects (for example, table length is 10 crayons or four pencils).

First Grade

1. measures length, weight, or capacity of an object using standard and nonstandard units (for example, pounds, grams, or wooden blocks).

Second Grade

1. measures length, weight, and capacity of objects using standard and nonstandard units.

Standard 2: The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).

Benchmark MA.B.2.1.1: The student uses direct (measured) and indirect (not measured) comparisons to order objects according to some measurable characteristics (length, weight).

Grade Level Expectations
The student:

Kindergarten

1. uses direct (side-by-side) comparisons to sort and order objects by their lengths.
2. uses indirect comparisons to compare lengths of objects that cannot be physically compared (side-by-side) (for example, compares height of counters in classroom and cafeteria by using string or in reference to child's own body).
3. compares and orders classroom objects by their weights, determining which objects weigh more, less, or about the same.

First Grade

1. uses nonstandard methods to compare and order objects according to their lengths or weights.
2. uses nonstandard, indirect methods to compare and order objects according to their lengths.
3. uses customary and metric units to measure, compare, and order objects according to their lengths or weights.

Second Grade

1. uses nonstandard methods to compare and order objects according to their lengths, weights, or capacities.
2. uses nonstandard, indirect methods to compare and order objects according to their lengths.
3. uses customary and metric units to measure, compare, and order objects according to their lengths, weights, or capacities.

Benchmark MA.B.2.1.2: The student understands the need for a uniform unit of measure to communicate in real-world situations.

Grade Level Expectations
The student:

Kindergarten

1. uses uniform nonstandard units to measure common classroom objects.

First Grade

1. knows that a uniform unit is needed to measure in real-world situations (for example, length, weight, time, capacity).

Second Grade

1. knows that a standard unit of measure is used in real-world situations to describe the measure of an object (for example, length, weight, time, capacity).

Standard 3: The student estimates measurements in real-world problem situations.

Benchmark MA.B.3.1.1: The student using a variety of strategies, estimates length, widths, time intervals, and money and compares them to actual measurements.

Grade Level Expectations
The student:

Kindergarten

1. uses nonstandard units to estimate, and verifies by measuring, the length and width of common classroom objects.
2. estimates and measures the time of day as day or night; morning, afternoon, or evening; and yesterday, today, or tomorrow.
3. knows which of two daily activities takes more or less time.
4. knows and compares the values of a penny (1 cent), nickel (5 cents), and dime (10 cents).

First Grade

1. estimates, measures, and compares dimensions of an object.
2. estimates and measures the passage of time using before or after; yesterday, today, or tomorrow; day or night; morning, afternoon, or evening; hour or half-hour.
3. knows and compares money values, including the quarter (25 cents), half-dollar (50 cents), and dollar (100 cents).

Second Grade

1. estimates, measures, and compares distances.

2. estimates, measures, and compares the passage of time using minutes, half-hours, and hours.
3. knows and compares amounts of money in coins, to one dollar or more.

Standard 4: The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations.

Benchmark MA.B.4.1.1: The student selects and uses an object to serve as a unit of measure, such as a paper clip, eraser, or marble.

Grade Level Expectations
The student:

Kindergarten

1. uses nonstandard units appropriately (for example, pencil, cubes, scoops of rice).

First Grade

1. selects and uses an appropriate nonstandard unit to measure length, weight, time, and capacity.

Second Grade

1. selects and uses an appropriate nonstandard unit to measure length, distance, weight, time, and capacity.

Benchmark MA.B.4.1.2: The student selects and uses appropriate instruments, such as scales, rulers, clocks, and technology to measure within customary or metric systems.

Grade Level Expectations
The student:

Kindergarten

1. knows various measuring tools for measuring length, weight, or capacity.
2. knows ways to measure time, including calendar, days, weeks, months, and days of week.

First Grade

1. knows appropriate standard tools for measuring linear dimensions, weight, capacity, and temperature.
2. knows appropriate tools (clocks and calendar) for measuring time (including days, weeks, months).

Second Grade

1. knows appropriate standard tools for measuring linear dimensions, weight, capacity, and temperature.
2. knows appropriate tools (clocks and calendar) for measuring time (including days, weeks, months, and years).

Strand C: Geometry and Spatial Sense
Standard 1: The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.
Benchmark MA.C.1.1.1: The student understands and describes the characteristics of basic two- and three-dimensional shapes.

Grade Level Expectations
The student:

Kindergarten

1. knows two-dimensional shapes (for example, circles, squares, rectangles, triangles), describing similarities and differences.
2. sorts three-dimensional objects by varied attributes (for example, identifying which can roll, stack, or slide).
3. sorts three-dimensional objects according to geometric shapes (for example, cubes, spheres, cylinders, cones).

First Grade

1. knows attributes of two-dimensional shapes (for example, vertices, edges).
2. knows attributes of three-dimensional figures (for example, vertices, curves, faces).
3. sorts two- and three-dimensional figures according to their attributes.

Second Grade

1. describes attributes of two-dimensional shapes using mathematical language (for example, curves, edges, vertices, angles).
2. describes attributes of three-dimensional shapes using mathematical language (for example, curves, vertices, edges, faces, angles).
3. sorts two- and three-dimensional figures according to their attributes.
4. knows the names of two-dimensional and three-dimensional figures presented in various orientations in the environment.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Standard 2: The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.

Benchmark MA.C.2.1.1: The student understands basic concepts of spatial relationships, symmetry, and reflections.

Grade Level Expectations
The student:

Kindergarten

1. recognizes symmetry in the environment.
2. uses concrete materials to make symmetrical figures (for example, paper fold, paint blot).
3. matches objects to outlines of their shapes.
4. knows spatial relationships (for example, in or out; above or below; over or under; top, bottom, or middle).
5. identifies left and right hand.

First Grade

1. understands lines of symmetry in two-dimensional shapes (for example, paper folding, ink blot pictures, mirrors).
2. knows shapes that can be combined to form other shapes (for example, using pattern blocks, six triangles make a hexagon).
3. uses concrete materials to construct the reflection of a given shape.
4. follows directions to move or place an object and describes the relationship of objects using positional language (for example, over, to the left of).

Second Grade

1. describes symmetry in two-dimensional shapes.
2. determines lines of symmetry of two-dimensional shapes by using concrete materials.
3. knows congruent shapes.
4. identifies shapes that can be combined or separated (for example, a rectangle can be separated into two triangles).
5. predicts the reflection of a given two-dimensional shape.

Benchmark MA.C.2.1.2: The student uses objects to perform geometric transformations, including flips, slides, and turns.

Grade Level Expectations
The student:

Kindergarten

1. follows directions to move or place an object in relation to another (for example, next to, to the right of).
2. uses concrete objects to explore slides and turns.

First Grade

1. demonstrates slides and turns using concrete materials.

Second Grade

1. identifies and demonstrates slides, flips, and turns of simple figures using concrete materials.

Standard 3: The student uses coordinate geometry to locate objects in both two- and three-dimensions and to describe objects algebraically.

Benchmark MA.C.3.1.1: The student uses real-life experiences and physical materials to describe, classify, compare, and sort geometric figures, including squares, rectangles, triangles, circles, cubes, rectangular solids, spheres, pyramids, cylinders, and prisms, according to the number of faces, edges, bases, and corners.

Grade Level Expectations
The student:

Kindergarten

1. recognizes, compares, and sorts real-world objects or models of solids.
2. knows the attributes of circles, squares, triangles, and rectangles (for example, edges, corners, curves).

First Grade

1. compares and sorts two-dimensional and three-dimensional real-life objects.
2. knows geometric shapes in real-life situations.
3. compares, describes, and sorts objects according to attributes (for example, corners, curves, faces).

Second Grade

1. compares and contrasts two- and three-dimensional real-life objects (for example, circle and sphere, square and cube, triangle and pyramid, rectangle and rectangular solid).
2. knows how two shapes or two solids are alike and different.
3. describes and classifies two-dimensional shapes and three-dimensional geometric objects according to the number of bases, faces, edges, and vertices.

Benchmark MA.C.3.1.2: The student plots and identifies positive whole numbers on a number line.

Grade Level Expectations
The student:

Kindergarten

1. locates known and unknown numbers on a number line from 0 to 10 or more (for example, finding what number you are on if you move 2 numbers forward or 3 numbers back).

First Grade

1. locates and explains known and unknown numbers on a number line from 0 to 100 or more.

Second Grade

1. locates and explains known and unknown numbers to 1000 or more on a number line.
2. locates and identifies the coordinate points of objects on a coordinate grid (**First Grade** quadrant).

Strand D: Algebraic Thinking
Standard 1: The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.

Benchmark MA.D.1.1.1: The student describes a wide variety of classification schemes and patterns related to physical characteristics and sensory attributes, such as rhythm, sound, shapes, colors, numbers, similar objects, similar events.

Grade Level Expectations
The student:

Kindergarten

1. identifies simple patterns of sounds, physical movements, and concrete objects.
2. sorts and classifies objects by color, shape, size, or kind.

3. identifies objects that do not belong to a particular group (for example, blue lid in set of red lids).

First Grade

1. identifies, describes, and compares patterns using a wide variety of materials and attributes (for example, size, shape, color).
2. describes a pattern rule.
3. explores number patterns on a hundred chart.
4. predicts and extends existing patterns that are concrete or pictorial.

Second Grade

1. recognizes that patterning results from repeating an operation, using a transformation, or making some other change to an attribute.
2. describes a given pattern and explains the pattern rule.
3. identifies number patterns on a hundred chart.

Benchmark MA.D.1.1.2: The student recognizes, extends, generalizes, and creates a wide variety of patterns and relationships using symbols and objects.

Grade Level Expectations
The student:

Kindergarten

1. predicts and extends existing patterns using concrete materials.
2. uses concrete objects to create a pattern.
3. transfers patterns from one medium to another (for example, actions, sounds, or concrete objects).

First Grade

1. uses one attribute to create a pattern (for example, thick or thin, open or closed).
2. transfers patterns from one medium to another (for example, concrete objects to actions or symbols).
3. predicts, extends, and creates patterns.
4. uses a calculator to explore number patterns.

5. identifies and generates patterns in a list of related number pairs based on real-life situations (for example, T-chart with number of children to number of eyes).

Number of Children	Number of Eyes
1	2
2	4

Second Grade

1. predicts, extends, and creates patterns that are concrete, pictorial or numerical.
2. combines two attributes in creating a pattern (for example, size and color).
3. transfers patterns from one medium to another (for example, pictorial to symbolic).
4. uses a calculator to explore and solve number patterns.
5. identifies patterns in the real-world (for example, repeating, rotational, tessellating, and patchwork).
6. identifies and generates patterns in a list of related number pairs based on real-life situations (for example, T-chart with number of tricycles to number of wheels).

Number of Tricycles	Number of Wheels
1	3
2	6

7. explains generalizations of patterns and relationships.

Standard 2: The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.

Benchmark MA.D.2.1.1: The student understands that geometric symbols (O, ❑) *can be used to represent unknown quantities in expressions, equations, and inequalities.*

Grade Level Expectations
The student:

Kindergarten

1. knows that symbols can be used to represent missing or unknown quantities (for example, fill in the missing number in 5, 6, ❑, 8,).

First Grade

1. solves addition and subtraction sentences where an unknown number is represented by a geometric shape (for example, 2 +❑= 9).

2. uses concrete objects to solve number sentences with equalities and inequalities (using the symbols >, =, <).

Second Grade

1. solves a variety of number sentences where the missing number is represented by a geometric shape (for example, 10-❑=6).
2. solves a variety of number sentences with equalities and inequalities (using the symbols >, =, <).

Benchmark MA.D.2.1.2: The student uses informal methods to solve real-world problems requiring simple equations that contain one variable.

Grade Level Expectations
The student:

Kindergarten

1. uses informal methods, such as pictures, concrete materials, and role playing, to solve real world problems.
2. uses one-to-one matching to determine if two groups are equal.

First Grade

1. uses concrete objects to solve real-world addition and subtraction problems using one unknown (for example, There are 28 children in this class, and 25 are here today. How many are absent?).

Second Grade

1. uses concrete objects, paper and pencil, or mental mathematics to solve real-world equations with one unknown (such as, There are 28 students in the room, and 16 brought their lunches. How many are buying lunch?).

Strand E: Data Analysis and Probability
Standard 1: The student understands and uses the tools of data analysis for managing information.

Benchmark MA.E.1.1.1: The student displays solutions to problems by generating, collecting, organizing, and analyzing data using simple graphs and charts.

Grade Level Expectations
The student:

Kindergarten

1. knows how to display answers to simple questions involving two categories or choices using concrete materials or pictures on a graph or chart (for example, in a class, number of boys and girls, students with buttons and students with no buttons).
2. interprets data exhibited in concrete or pictorial graphs.

First Grade

1. surveys a small group to answer a simple question involving two categories or choices (for example, students who bring lunches or students who buy lunches).
2. records data using concrete materials or pictures.
3. organizes information into a simple pictograph or concrete graph.
4. uses mathematical language to read and interpret data on a simple concrete graph, pictorial graph, or chart.

Second Grade

1. poses questions and collects data to answer questions with two, three, or more categories or choices (for example, favorite ice cream, left handed/right handed).
2. records data using pictures, concrete materials, or tally marks.
3. organizes survey information into a simple pictograph, concrete graph, or chart.
4. uses mathematical language to read and interpret data on a simple concrete graph, pictorial graph, or chart.

Benchmark MA.E.1.1.2: The student displays data in a simple model to use the concepts of range, median, and mode.

Grade Level Expectations
The student:

Kindergarten

1. with teacher direction, uses concrete materials, pictures, or graphs to show range and mode (for example, on a human, block, or picture graph showing number of brother and sisters, range is from zero to highest number of siblings; mode is number of siblings most common in class).

First Grade

1. uses concrete materials, pictures, or graphs to display data and identify range and mode.

Second Grade

1. uses concrete materials, pictures, or graphs to display data and identify range, mode, and median.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Benchmark MA.E.1.1.3: The student analyzes real-world data by surveying a sample space and predicting the generalization onto a larger population through the use of appropriate technology, including calculators and computers.

Grade Level Expectations
The student:

Kindergarten

1. collects, displays data, and makes generalizations (for example, determines number of pockets on 5 children; predicts how many 10 students or the whole class will have).

First Grade

1. discusses a reasonable prediction for a large group using data from a small group.
2. uses a calculator to compare data.
3. explores computer graphing software.

Second Grade

1. predicts the outcome for a larger population by analyzing data from a smaller group.
2. uses a calculator to compare data.
3. constructs a graph using computer software.

Standard 2: The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.

Benchmark: MA.E.2.1.1: The student understands basic concepts of chance and probability.

Grade Level Expectations
The student:

Kindergarten

1. knows the likelihood of a given situation (for example, Could a lion come visit you? Will we have school tomorrow? Will it rain today?).
2. participates in games or activities dependent upon chance (for example, using spinners or number cubes).

First Grade

1. knows the likelihood of a given situation (for example, snowing in South Florida).
2. explains if an event is certain, probable, or impossible.
3. discusses results of games and activities dependent upon chance.

Second Grade

1. knows the likelihood of a given situation (for example, coin toss, spinners, baseball game).
2. knows if an event is certain, probable, or impossible.
3. records results of activities involving chance and makes predictions based upon data (for example, coin flips, number cube rolls, bean toss on area divided into unequal portions).

Benchmark MA.E.2.1.2: The student predicts which simple event is more likely, equally likely, or less likely to occur.

Grade Level Expectations
The student:

Kindergarten

1. knows if a given event is more likely, equally likely, or less likely to occur (for example, chicken nuggets or pizza for lunch in the cafeteria).

First Grade

1. knows if a given event is more likely, equally likely, or less likely to occur (for example, six blue marbles and two green marbles in a bag).

Second Grade

1. knows if a given event is equally likely, most likely, or least likely to occur (for example, spinners, coin toss, election results).

Standard 3: The student uses statistical methods to make inferences and valid arguments about real-world situations.

Benchmark MA.E. 3.1.1: The student designs a simple experiment to answer a class question, collects appropriate information, and interprets the results using graphical displays of information, such as line graphs, pictographs, and charts.

Grade Level Expectations
The student:

Kindergarten

1. displays the answer to a simple class question with two categories using concrete materials, a pictograph, or chart (for example, hot or cold; wings or no wings).
2. describes data displayed concretely or pictorially.

First Grade

1. constructs appropriate questions for a class survey, in a whole group setting.

2. collects data for a survey with two or more categories or choices and creates a class chart or pictograph.
3. analyzes results of a survey as part of a class discussion.

Second Grade

1. constructs appropriate questions for a class survey.
2. collects data for two or more categories and creates a line graph, pictograph, or chart to display results.
3. analyzes and explains orally or in writing the results from a survey.

Benchmark MA.E.3.1.2: The student decides what information is appropriate and how data can be collected, displayed, and interpreted to answer relevant questions.

Grade Level Expectations
The student:

Kindergarten

1. determines through class discussions questions for a simple two-choice survey so that the collected information will answer the questions.
2. knows an appropriate method to display the information.

First Grade

1. determines questions for a two-category survey so that the collected information will answer the question.
2. knows appropriate methods to display and interpret information.

Second Grade

1. determines questions for a survey with two, three, or more categories so that the collected information will be relevant to the questions.
2. knows appropriate methods to display and interpret information.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Strand A: Number Sense, Concepts, and Operations

Standard 1: The student understands the different ways numbers are represented and used in the real world.

Benchmark MA.A.1.2.1: The student names whole numbers combining 3-digit numeration (hundreds, tens, ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents.

Grade Level Expectations
The student:

Third Grade

1. reads, writes, and identifies whole numbers through hundred thousands or more.
2. reads, writes, and identifies proper fractions with denominators including 2, 3, 4, 5, 6, 8, 10, and 100.
3. reads, writes, and identifies decimal notation in the context of money.

Fourth Grade

1. reads, writes, and identifies whole numbers through millions or more.
2. reads, writes, and identifies fractions and mixed numbers with denominators including 2, 3, 4, 5, 6, 8, 10, 12, 20, 25, 100, and 1000.
3. reads, writes, and identifies decimals through hundredths.

Fifth Grade

1. reads, writes, and identifies whole numbers, fractions, and mixed numbers.
2. reads, writes, and identifies decimals through thousandths.
3. reads, writes, and identifies common percents including 10%, 20%, 25%, 30%, 40%, 50%, 60%, 70%, 75% , 80%, 90%, and 100%.

Benchmark MA.A.1.2.2: The student understands the relative size of whole numbers, commonly used fractions, decimals, and percents.

Grade Level Expectations
The student:

Third Grade

1. uses language and symbols (>, <, =) to compare the relative size of numbers in the same form.
2. compares and orders whole numbers through hundred thousands or more, using concrete materials, number lines, drawings, and numerals.

3. compares and orders commonly used fractions, including halves, **Third Grade**s, **Fourth Grade**s, **Fifth Grade**s, sixths and eighths, using concrete materials.

Fourth Grade

1. uses language and symbols (>, <, =) to compare numbers in the same form and in two different forms such as ¾ < 1.
2. compares and orders whole numbers through millions or more, using concrete materials, number lines, drawings, and numerals.
3. compares and orders commonly used fractions and decimals to hundredths using concrete materials, drawings, and numerals.
4. locates whole numbers, fractions, mixed numbers, and decimals on a number line.

Fifth Grade

1. uses symbols (>, <, =) to compare numbers in the same and different forms such as 0.5 < 3/4.
2. compares and orders whole numbers using concrete materials, number lines, drawings, and numerals.
3. compares and orders commonly used fractions, percents, and decimals to thousandths using concrete materials, number lines, drawings, and numerals.
4. locates whole numbers, fractions, mixed numbers, and decimals on the same number line.

Benchmark MA.A.1.2.3: The student understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations.

Grade Level Expectations
The student:

Third Grade

1. translates problem situations into diagrams and models using whole numbers, fractions, and decimal notation in the context of money.

Fourth Grade

1. translates problem situations into diagrams and models using whole numbers, fractions, mixed numbers and decimals to hundredths including money notation.

Fifth Grade

1. translates problem situations into diagrams, models, and numerals using whole numbers, fractions, mixed numbers, decimals, and percents.

Benchmark MA.A.1.2.4: The student understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents.

Grade Level Expectations
The student:

Third Grade

1. uses concrete materials to model equivalent forms of whole numbers and common fractions.
2. identifies equivalent forms of numbers.
3. knows that two numbers in different forms are equivalent or non-equivalent, using whole numbers, fractions, and decimals in the context of money.

Fourth Grade

1. uses concrete materials to model equivalent forms of whole numbers, fractions, and decimals.
2. identifies equivalent forms of numbers.
3. knows that two numbers in different forms are equivalent or non-equivalent, using whole numbers, decimals, fractions, and mixed numbers.

Fifth Grade

1. knows that numbers in different forms are equivalent or nonequivalent, using whole numbers, decimals, fractions, mixed numbers, and percents.

Standard 2: The student understands number systems.

Benchmark MA.A.2.2.1: The student uses place-value concepts of grouping based upon powers of ten (thousandths, hundredths, tenths, ones, tens, hundreds, thousands) within the decimal number system.

Grade Level Expectations
The student:

Third Grade

1. knows the value of a given digit in whole numbers to hundred thousands, including writing and interpreting expanded forms of numbers.
2. knows that the value of each place is 10 times that of the place to its right (for example, 1,000 = 10 x 100).

Fourth Grade

1. knows the value of a given digit in numbers from hundredths to millions, including writing and interpreting expanded forms of numbers.

Fifth Grade

1. knows that place value relates to powers of 10.
2. expresses numbers to millions or more in expanded form using powers of ten, with or without exponential notation.

Benchmark MA.A.2.2.2: The student recognizes and compares the decimal number system to the structure of other number systems such as the Roman numeral system or bases other than ten.

Grade Level Expectations
The student:

Third Grade

1. compares the decimal (base 10) number system to the Roman numeral system using the Roman numerals I, V, X, L, and C.

Fourth Grade

1. uses concrete materials and symbolic notation to represent numbers in bases other than base ten, such as base five.
2. reads, writes, and compares the decimal number system to the Roman numeral system using the Roman numerals I, V, X, L, C, D, and M.

Fifth Grade

1. explains the similarities and differences between the decimal (base 10) number system and other number systems that do or do not use place value.

Standard 3: The student understands the effects of operations on numbers and the relationship among these operations, selects appropriate operations, and computes for problem solving.

Benchmark MA.A.3.2.1: The student understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division.

Grade Level Expectations
The student:

Third Grade

1. explains and demonstrates the addition and subtraction of whole numbers (up to three digits or more) using concrete materials, drawings, symbols, and algorithms.
2. explains the inverse relationship of addition and subtraction and demonstrates that relationship by writing related fact families.

3. explains and demonstrates the meaning of multiplication (for the repeated addition, array, and area models) using manipulatives, drawings, number sentences, and story problems.
4. explains and demonstrates the meaning of division and of remainders (for the repeated subtraction and partitive models) using manipulatives, drawings, number sentences, and story problems.
5. solves multiplication basic facts using various strategies including the following:
   - modeling with concrete objects or drawings
   - skip counting, for example, to find 4 x 5, count 5, 10, 15, 20
   - using doubles and near doubles, such as 3 x 8 = (2 x 8) + 8
   - applying the commutative property of multiplication, such as 7 x 3 = 3 x 7
   - applying the distributive property of multiplication, such as 8 x 7 = (8 x 5) + (8 x 2)
   - noting and applying patterns in the "facts tables," such as the regularity in the "nines"
   - using the zero and identity properties of multiplication
6. explains the inverse relationship of multiplication and division and writes related fact families.
7. predicts the relative size of solutions in addition, subtraction, multiplication, and division of whole numbers (for example, dividing a whole number by a smaller whole number results in another number that is smaller than the original number).

Fourth Grade

1. recalls (from memory) basic multiplication facts and related division facts.
2. knows the inverse relationship of multiplication and division and demonstrates that relationship by writing related fact families.
3. explains and demonstrates the multiplication and division of whole numbers using manipulatives, drawings, and algorithms.
4. explains and demonstrates the addition and subtraction of common fractions using concrete materials, drawings, story problems, and algorithms.
5. explains and demonstrates the addition and subtraction of decimals (to hundredths) using concrete materials, drawings, story problems, and algorithms.
6. knows the properties of numbers including the following:
   - the identity, commutative, and associative properties of addition
   - the zero and identity properties of multiplication
   - the commutative, associative, and distributive properties of multiplication.
7. predicts the relative size of solutions in the following:
   - addition, subtraction, multiplication, and division of whole numbers
   - addition and subtraction of common fractions
   - addition and subtraction of decimals to hundredths

Fifth Grade

1. explains and demonstrates the multiplication of common fractions using concrete materials, drawings, story problems, symbols, and algorithms.
2. explains and demonstrates the multiplication of decimals to hundredths using concrete materials, drawings, story problems, symbols, and algorithms.
3. predicts the relative size of solutions in the following:
   - addition, subtraction, multiplication, and division of whole numbers
   - addition, subtraction, and multiplication of fractions, decimals, and mixed numbers, with particular attention given to fraction and decimal multiplication (for example, when two numbers less than one are multiplied, the result is a number less than either factor)
4. explains and demonstrates the inverse nature of multiplication and division, with particular attention to multiplication by a fraction (for example, multiplying by ¼ yields the same result as dividing by 4).
5. explains and demonstrates the commutative, associative, and distributive properties of multiplication.

Benchmark MA.A.3.2.2: The student selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers.

Grade Level Expectations
The student:

Third Grade

1. writes number sentences for given situations involving the addition, subtraction, multiplication, and division of whole numbers.
2. uses problem-solving strategies to determine the operation needed to solve one-step problems involving addition, subtraction, multiplication, and division of whole numbers.

Fourth Grade

1. uses problem-solving strategies to determine the operation(s) needed to solve one- and two-step problems involving addition, subtraction, multiplication, and division of whole numbers, and addition and subtraction of decimals and fractions.

Fifth Grade

1. uses problem-solving strategies to determine the operation(s) needed to solve one- and two-step problems involving addition, subtraction, multiplication, and division of whole numbers, and addition, subtraction, and multiplication of decimals and fractions.

Benchmark MA.A.3.2.3: The student adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

Grade Level Expectations
The student:

Third Grade

1. solves real-world problems involving addition, subtraction, multiplication, and division of whole numbers using an appropriate method (for example, mental math, paper and pencil, concrete materials, calculator).
2. explains the reason for choosing a particular computing method for a particular problem.
3. solves real-world multiplication problems with whole numbers (two digits by one digit) using concrete materials, drawings, and paper and pencil.
4. solves real-world division problems having divisors of one digit, dividends not exceeding two digits, with or without remainders.

Fourth Grade

1. solves real-world problems involving addition, subtraction, multiplication, and division of whole numbers, and addition and subtraction of decimals and fractions using an appropriate method (for example, mental math, pencil and paper, calculator).
2. explains the reason for choosing a particular computing method for a particular problem.
3. solves real-world multiplication problems with whole numbers (three digits by one digit) using concrete materials, drawings, and pencil and paper.
4. solves real-world division problems having divisors of one digit and dividends of three digits, with or without remainders.
5. solves real-world problems involving the addition or subtraction of decimals (to hundredths) or common fractions with like or unlike denominators.

Fifth Grade

1. solves real-world problems involving addition, subtraction, multiplication, and division of whole numbers, and addition, subtraction, and multiplication of decimals, fractions, and mixed numbers using an appropriate method (for example, mental math, pencil and paper, calculator).

Standard 4: The student uses estimation in problem solving and computation.

Benchmark MA.A.4.2.1: The student uses and justifies different estimation strategies in a real-world problem situation and determines the reasonableness of results of calculations in a given problem situation.

Grade Level Expectations
The student:

Third Grade

1. uses estimation strategies to determine a reasonable estimate of a quantity.
2. estimates quantities of objects to 250 or more (for example, using a benchmark or reference set of fewer objects).
3. chooses estimation strategies (for example, front-end, rounding) in real-world problem situations and explains the choice.

Fourth Grade

1. chooses, describes and explains estimation strategies used to determine the reasonableness of solutions to real-world problems.
2. estimates quantities of objects to 500 or more and justifies and explains the reasoning for the estimates (for example, using compatible numbers, benchmark numbers, unitizing).

Fifth Grade

1. chooses, describes, and explains estimation strategies used to determine the reasonableness of solutions to real-world problems.
2. estimates quantities of objects to 1000 or more and justifies and explains the reasoning for the estimate (for example, using benchmark numbers, unitizing).

Standard 5: The student understands and applies theories related to numbers.

Benchmark MA.A.5.2.1: The student understands and applies basic number theory concepts, including primes, composites, factors, and multiples.

Grade Level Expectations
The student:

Third Grade

1. knows multiples of whole numbers (with products to 60 or more).

2. uses a model to determine factors of whole numbers through 100 (for example, array).
3. uses tables and charts to determine multiples of whole numbers 1-10 (for example, hundred chart, calendar).

Fourth Grade

1. knows factors and multiples of numbers to 100.
2. multiplies by 10, 100, and 1,000 recognizing and demonstrating patterns.
3. knows rules of divisibility for 2, 3, 5, 9, and 10.
4. uses models to identify perfect squares to 100.

Fifth Grade

1. finds factors of numbers to 100 to determine if they are prime or composite.
2. expresses a whole number as a product of its prime factors.
3. determines the greatest common factor of two numbers.
4. determines the least common multiple of two numbers up to 100 or more.
5. multiplies by powers of 10 (100, 1,000, and 10,000) demonstrating patterns.
6. identifies and applies rules of divisibility for 2, 3, 4, 5, 6, 9, and 10.
7. uses models to identify perfect squares to 144.

Strand B: Measurement
Standard 1: The student measures quantities in the real world and uses the measures to solve problems.

Benchmark MA.B.1.2.1: The student uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight, time, temperature, perimeter, area, volume, and angle.

Grade Level Expectations
The student:

Third Grade

1. knows measurement concepts and can use oral and written language to communicate them..
2. uses a wide variety of concrete objects to investigate measurement of length, weight, capacity, area, perimeter, and volume (for example, cubes, grid paper, string, squares).
3. knows about measurement of time including using A.M. and P.M., clocks and calendars.
4. knows temperature scales and uses thermometers.
5. knows right angles (90°).

Fourth Grade

1. knows measurement concepts and can use oral and written language to communicate them.

2. uses a wide variety of models (for example, manipulatives, diagrams) and applies counting procedures to investigate measurements of length, area, volume, and perimeter.
3. knows about varied time intervals, including decades, hours, minutes, and seconds.
4. investigates angle measures using models and manipulatives for the common angles of 45°, 90°, and 180° (straight angle) and uses these angles as reference points for measures of other angles.

Fifth Grade

1. knows measurement concepts and can use oral and written language to communicate them.
2. extends conceptual experiences into patterns to develop formulas for determining perimeter, area, and volume.
3. knows varied units of time that include centuries and seconds.
4. classifies angle measures as acute, obtuse, right, or straight.
5. investigates measures of circumference using concrete materials (for example, uses string or measuring tape to measure the circumference of cans or bottles).

Benchmark MA.B.1.2.2: The student solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.

Grade Level Expectations
The student:

Third Grade

1. solves real-world problems involving measurement using concrete and pictorial models for the following:
   - length (for example, half-inch, centimeter)
   - weight (for example, pound, kilogram)
   - time (fifteen-, five-, and one-minute intervals)
   - capacity (for example, cup, liter)
   - temperature (Fahrenheit and Celsius)
   - angles (right)
2. solves real-world problems involving perimeter, area, and volume using concrete materials or graphic models.
3. uses schedules, calendars, and elapsed time in hour intervals to solve real-world problems.

Fourth Grade

1. solves real-world problems involving measurement of the following:
   - length (for example, millimeter, quarter-inch, foot, yard, meter)
   - weight (for example, pounds, ounces, kilograms, grams)

- capacity (for example, cup, milliliters)
- temperature (Fahrenheit and Celsius)
- angles (right and straight)

2. solves real-world problems involving perimeter, area, and volume using concrete, graphic, or pictorial models.
3. uses schedules, calendars, and elapsed time to solve real-world problems.

Fifth Grade

1. solves real-world problems involving measurement of the following:
   - length (for example, eighth-inch, kilometer, mile)
   - weight or mass (for example, milligram, ton)
   - temperature (comparing temperature changes within the same scale using either a Fahrenheit or a Celsius thermometer)
   - angles (acute, obtuse, straight)
2. solves real-world problems involving perimeter, area, capacity, and volume using concrete, graphic or pictorial models.
3. uses schedules, calendars, and elapsed time to solve real-world problems.

Standard 2: The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).

Benchmark MA.B.2.2.1: The student uses direct (measured) and indirect (not measured) measures to calculate and compare measurable characteristics.

Grade Level Expectations
The student:

Third Grade

1. calculates and compares measurable characteristics using manipulatives (for example, creates a meter using centimeter cubes).
2. devises nonstandard, indirect ways to compare lengths that cannot be physically compared (side-by-side) (for example, uses string to compare the lengths of crooked paths).
3. uses customary and metric units to compare length, weight, and capacity.

Fourth Grade

1. devises nonstandard, indirect ways to compare lengths (for example, compare the height of a cylinder to the distance around it).
2. uses customary and metric units to compare length, weight, and capacity or volume.

3. uses multiplication or division to convert units of measure within either the customary or metric system (for example: 100 cm = 1 m).

Fifth Grade

1. finds the length or height of "hard-to-reach" objects by using the measure of a portion of the objects (for example, find the height of a room or building by finding the height of one block or floor and multiplying by the number of blocks or floors).
2. uses customary and metric units to compare length, weight or mass, and capacity or volume.
3. uses multiplication and division to convert units of measure within the customary or metric system.

Benchmark MA.B.2.2.2: The student selects and uses appropriate standard and nonstandard units of measurement, according to type and size.

Grade Level Expectations
The student:

Third Grade

1. knows an appropriate unit of measure to determine the dimension(s) of a given object (for example, standard - student chooses centimeters instead of meters to measure a pencil; nonstandard - student chooses a paper clip instead of his or her hand to measure a pencil).
2. knows an appropriate unit of measure (standard or nonstandard) to measure weight and capacity.

Fourth Grade

1. knows an appropriate unit of measure to determine the dimension(s) of a given object (for example, standard - student chooses feet or inches instead of yards to measure a classroom desk; nonstandard - student chooses a pencil or his or her hand to measure a classroom desk).
2. knows an appropriate unit of measure (standard or nonstandard) to measure weight and capacity.

Fifth Grade

1. knows an appropriate unit of measure to determine the dimension(s) of a given object (for example, standard - student chooses feet or yards instead of inches to measure a room; nonstandard - student chooses a length of yarn instead of a pencil to measure a room).
2. knows an appropriate unit of measure (standard or nonstandard) to measure weight, mass, and capacity.

Standard 3: The student estimates measurements in real-world problem situations.

Benchmark MA.B.3.2.1: The student solves real-world problems involving estimates of measurements, including length, time, weight, temperature, money, perimeter, area, and volume.

Grade Level Expectations
The student:

Third Grade

1. knows how to determine whether an accurate or estimated measurement is needed for a solution.
2. using real-world settings, objects, graph paper, or charts, solves problems involving estimated measurements including the following:
    - length to nearest inch, centimeter
    - weight to nearest pound, kilogram
    - time to nearest half-hour interval
    - temperature to nearest five-degree interval
    - money to nearest $1 or $10 (combination of coin and currency)
3. knows how to estimate the area and perimeter of square and rectangular shapes using graph paper, geoboard or other manipulatives.
4. knows how to estimate the volume of a rectangular prism using manipulatives.

Fourth Grade

1. knows how to determine whether an accurate or estimated measurement is needed for a solution.
2. using real-world settings, objects, graph paper, or charts, solves problems involving estimated measurements, including the following:
    - length to nearest half-inch, centimeter
    - weight to nearest ounce, gram
    - time to nearest five-minute interval
    - temperature to nearest five-degree interval
    - money to nearest $1.00 (combination of coin and currency)
3. knows how to estimate the area and perimeter of regular and irregular polygons using graph paper, geoboard, or other objects.
4. knows how to estimate the volume of a rectangular prism using manipulatives or graphic representation.

Fifth Grade

1. knows how to determine whether an accurate or estimated measurement is needed for a solution.
2. solves real-world problems involving estimated measurements, including the following:
   - length to nearest quarter-inch, centimeter
   - weight to nearest ounce, gram
   - time to nearest one-minute interval
   - temperature to nearest five-degree interval
   - money to nearest $1.00
3. knows how to estimate the area and perimeter of regular and irregular polygons.
4. knows how to estimate the volume of a rectangular prism.

Standard 4: The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations.

Benchmark MA.B.4.2.1: The student determines which units of measurement, such as seconds, square inches, dollars per tankful, to use with answers to real-world problems.

Grade Level Expectations
The student:

Third Grade

1. selects an appropriate measurement unit for labeling the solution to real-world problems.

Fourth Grade

1. selects an appropriate measurement unit for labeling the solution to real-world problems.

Fifth Grade

1. selects an appropriate measurement unit for labeling the solution to real-world problems.

Benchmark MA.B.4.2.2: The student selects and uses appropriate instruments and technology, including scales, rulers, thermometers, measuring cups, protractors, and gauges, to measure in real-world situations.

Grade Level Expectations
The student:

Third Grade

1. selects and uses the appropriate tool for situational measures (for example, measuring sticks, scales and balances, thermometers, measuring cups).

Fourth Grade

1. selects and uses the appropriate tool for situational measures (for example, measuring sticks, scales and balances, thermometers, measuring cups, gauges).

Fifth Grade

1. selects and uses the appropriate tool for situational measures (for example, measuring sticks, scales and balances, thermometer, measuring cups, gauges, protractors).

Strand C: Geometry and Spatial Sense
Standard 1: The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.

Benchmark MA.C.1.2.1: The student given a verbal description, draws and/or models two- and three-dimensional shapes and uses appropriate geometric vocabulary to write a description of a figure or a picture composed of geometric figures.

Grade Level Expectations
The student:

Third Grade

1. uses appropriate geometric vocabulary to describe two- and three-dimensional figures (for example, parallel and perpendicular lines, quadrilateral, right angle).
2. draws and classifies two-dimensional figures having up to six or more sides.
3. uses appropriate geometric vocabulary to describe properties of two-dimensional figures.

Fourth Grade

1. uses appropriate geometric vocabulary to describe properties and attributes of two- and three-dimensional figures (for example, faces, edges, vertices, diameter).
2. draws and classifies two-dimensional figures having up to eight or more sides.

Fifth Grade

1. uses appropriate geometric vocabulary to describe properties and attributes of two- and three-dimensional figures (for example, obtuse and acute angles; radius; equilateral, scalene, and isosceles triangles.).
2. draws and classifies two-dimensional figures having up to ten or more sides and three-dimensional figures (for example, cubes, rectangular prisms, pyramids).

3. knows the characteristics of and relationships among points, lines, line segments, rays, and planes.

Standard 2: The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.

Benchmark MA.C.2.2.1: The student understands the concepts of spatial relationships, symmetry, reflections, congruency, and similarity.

Grade Level Expectations
The student:

Third Grade

1. uses manipulatives to solve problems requiring spatial visualization.
2. knows symmetry, congruency, and reflections in geometric figures using concrete materials (for example, pattern blocks, geoboards, mirrors).
3. knows congruent and similar figures.

Fourth Grade

1. uses manipulatives to solve problems requiring spatial visualization.
2. knows symmetry, congruency, and reflections in geometric figures using drawings and concrete materials (for example, pattern blocks, mirrors).
3. knows and creates congruent and similar figures.

Fifth Grade

1. uses manipulatives to solve problems requiring spatial visualization.
2. knows symmetry, congruency, and reflections in geometric figures.
3. knows how to justify that two figures are similar or congruent.

Benchmark MA.C.2.2.2: The student predicts, illustrates, and verifies which figures could result from a flip, slide, or turn of a given figure.

Grade Level Expectations
The student:

Third Grade

1. explores flips, slides, and 180^o turns (either clockwise or counterclockwise) using concrete and graphic materials (for example, pattern blocks, geoboards, dot paper).
2. knows the effect of a flip, slide, and 180^o turn on a geometric figure.

3. explores tessellations.

Fourth Grade

1. identifies and performs flips, slides, and turns given angle (90^o, 180^o) and direction (clockwise or counterclockwise) of turn, using concrete and graphic materials (for example, pattern blocks, geoboards, grid paper).
2. knows the effect of a flip, slide, or turn (90^o, 180^o) on a geometric figure.
3. explores tessellations.

Fifth Grade

1. identifies and performs flips, slides, and turns given angle (90^o, 180^o, 270^o) and direction (clockwise or counterclockwise) of turn.
2. knows the effect of a flip, slide or turn (90^o, 180^o, 270^o) on a geometric figure.
3. explores tessellations.

Standard 3: The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically.

Benchmark MA.C.3.2.1: The student represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems.

Grade Level Expectations
The student:

Third Grade

1. compares the concepts of area and perimeter through the use of concrete and graphic materials (for example, geoboards, color tiles, grid paper).
2. applies the concepts of area and perimeter of rectangles to solve real-world and mathematical problems through the use of concrete materials (for example, framing a photograph).

Fourth Grade

1. compares the concepts of area and perimeter using concrete materials (for example, color tiles, grid paper) and real-world situations (for example, carpeting a floor, fencing a yard).
2. applies the concepts of area and perimeter to solve real-world and mathematical problems.
3. knows how area and perimeter are affected when geometric figures are combined.

Fifth Grade

1. compares the concepts of area, perimeter, and volume using concrete materials (for example, geoboards, grid paper) and real-world situations (for example, tiling a floor, bordering a room, packing a box).

2. applies the concepts of area, perimeter, and volume to solve real-world and mathematical problems using student-developed formulas.
3. knows how area and perimeter are affected when geometric figures are combined, rearranged, enlarged, or reduced (for example, What happens to the area of a square when the sides are doubled?).

Benchmark MA.C.3.2.2: The student identifies and plots positive ordered pairs (whole numbers) in a rectangular coordinate system (graph).

Grade Level Expectations
The student:

Third Grade

1. knows how to identify, locate, and plot ordered pairs of whole numbers on a graph.

Fourth Grade

1. knows how to identify, locate, and plot ordered pairs of whole numbers on a graph or on the first quadrant of a coordinate system.

Fifth Grade

1. knows how to identify, locate, and plot ordered pairs of whole numbers on a graph or on the first quadrant of a coordinate system.

Strand D: Algebraic Thinking
Standard 1: The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.

Benchmark MA.D.1.2.1: The student describes a wide variety of patterns and relationships through models, such as manipulatives, tables, graphs, rules using algebraic symbols.

Grade Level Expectations
The student:

Third Grade

1. identifies missing parts in patterns.
2. describes, extends, and creates numerical and geometric patterns through models (for example, concrete objects, drawings, simple number sequences).
3. poses and solves problems by identifying a predictable visual or numerical pattern (for example: Continue this pattern: + , - , = , + , + , - , - ,___ , ___, …).

Fourth Grade

1. describes, extends, and creates numerical and geometric patterns using a variety of models (for example, lists, tables, charts).
2. poses, solves, and explains problems by identifying a predictable visual or numerical pattern such as:

Input	1	2	3	7
Output	$3	$6	$9	?

Fifth Grade

1. describes, extends, creates, predicts, and generalizes numerical and geometric patterns using a variety of models (for example, lists, tables, graphs, charts, diagrams, calendar math).
2. poses and solves problems by identifying a predictable visual or numerical pattern such as:

Day	1	2	3	4	…	*n*
Number of Calls	4	7	10	?		?

3. explains and expresses numerical relationships and pattern generalizations, using algebraic symbols (for example, in the problem above, the number of calls on the *n*th day can be expressed as 3*n*+1).

Benchmark MA.D.1.2.2: The student generalizes a pattern, relation, or function to explain how a change in one quantity results in a change in another.

Grade Level Expectations
The student:

Third Grade

1. knows mathematical relationships in patterns (for example, the second number is two more than the first).
2. analyzes number patterns and states the rule for relationships (for example, 2, 4, 6, 8, …; the rule: +2).
3. discusses and explains the choice of the rule that applies to the pattern.
4. identifies and extends a pattern according to the given rule.
5. applies and explains the appropriate rule to complete a table or chart (for example, in the following table, the rule is “multiply by 6”):

1	2	3	4
6	12	?	24

Fourth Grade

1. knows mathematical relationships in patterns (for example, the second shape is the first shape turned 90^{o}).
2. analyzes number patterns and states rules for relationships (for example, 2, 4, 7, 9, 12, …; the rule is: +2, +3, +2, +3, …).
3. discusses, explains, and analyzes the rule that applies to the pattern.
4. applies the appropriate rule to complete a table or a chart such as:

Input	Output
2	8
9	36
?	16
7	28

Fifth Grade

1. knows mathematical relationships in patterns (for example, Fibonacci numbers: 1, 1, 2, 3, 5, 8,…).
2. analyzes and generalizes number patterns and states the rule for relationships (for example, 1, 4, 9, 16, …; the rule: +3, +5, +7, …; or "squares of the whole numbers").
3. applies the appropriate rule to complete a table or a chart, such as:

IN	1	2	3	9
OUT	1	4	9	?

Standard 2: The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.

Benchmark MA.D.2.2.1: The student represents a given simple problem situation using diagrams, models, and symbolic expressions translated from verbal phrases, or verbal phrases translated from symbolic expressions, etc.

Grade Level Expectations
The student:

Third Grade

1. uses concrete materials to model and solve a number sentence with a missing addend for simple word problems (for example, $13 + r = 15$).
2. creates a simple word problem for a given number sentence, diagram, or model.

3. knows that an equation is a number sentence stating that two quantities are equal (for example, identifies and provides examples and non-examples of equations).

Fourth Grade

1. solves problems involving equations or simple inequalities using manipulatives, diagrams, or models, symbolic expressions, or written phrases.
2. uses a variable to represent a given verbal expression (for example, seven times a number is $7n$).
3. translates problem-solving situations into expressions and equations using a variable for the unknown.

Fifth Grade

1. solves problems involving simple equations or inequalities using diagrams or models, symbolic expressions, or written phrases.
2. uses a variable to represent a given verbal expression (for example, 5 more than a number is $n + 5$).
3. translates equations into verbal and written problem situations.

Benchmark MA.D.2.2.2: The student uses informal methods, such as physical models and graphs to solve real-world problems involving equations and inequalities.

Grade Level Expectations
The student:

Third Grade

1. uses physical models and graphs (for example, cubes, number lines) to solve real-world equations and inequalities.
2. uses information from physical models and graphs to solve problems.

Fourth Grade

1. uses physical or pictorial models and graphs (for example, cubes, number lines) to solve equations or inequalities.
2. uses information from physical models, graphs, or tables to solve problems.

Fifth Grade

1. uses concrete or pictorial models and graphs (for example, drawings, number lines) to solve equations or inequalities.
2. uses information from concrete or pictorial models or graphs to solve problems.

Strand E: Data Analysis and Probability

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Standard 1: The student understands and uses the tools of data analysis for managing information.

Benchmark MA.E.1.2.1: The student solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts.

Grade Level Expectations
The student:

Third Grade

1. identifies different parts of a graph (for example, titles, labels, key).
2. interprets and compares information from picto- and bar graphs including graphs from content-area materials and periodicals.
3. generates questions, collects responses, and displays data in a table, pictograph or bar graph.
4. interprets and explains orally and in writing displays of data.

Fourth Grade

1. knows the purpose of different parts of a graph (for example, titles, labels, intervals, key).
2. chooses reasonable titles and labels for graphs.
3. interprets and compares information from different types of graphs including graphs from content-area materials and periodicals.
4. generates questions, collects responses, and displays data on a pictograph, circle graph, bar, double bar, or line graph.
5. interprets and completes circle graphs using common fractions.
6. analyzes and explains orally or in writing the implications of data displays.

Fifth Grade

1. knows which types of graphs are appropriate for different kinds of data (for example, bar graphs, line, or circle graphs).
2. interprets and compares information from different types of graphs including graphs from content-area materials and periodicals.
3. chooses reasonable titles, labels, scales and intervals for organizing data on graphs.
4. generates questions, collects responses, and displays data on a graph.
5. interprets and completes circle graphs using common fractions or percents.
6. analyzes and explains orally or in writing the implications of graphed data.

Benchmark MA.E.1.2.2: The student determines range, mean, median, and mode from sets of data.

Grade Level Expectations
The student:

Third Grade

1. uses concrete materials to determine the mean in a set.
2. identifies the median and mode from a set of numerical data.
3. identifies the range in a set of numerical data.
4. uses concrete materials, pictures, or graphs to display data and identify range, median, and mode.

Fourth Grade

1. identifies the mean, median and mode from a set of data.
2. identifies the range on a line graph.

Fifth Grade

1. uses a stem-and-leaf plot from a set of data to identify the range, median, mean, and mode.
2. uses range and measures of central tendency in real-world situations.

Benchmark MA.E.1.2.3: The student analyzes real-world data to recognize patterns and relationships of the measures of central tendency using tables, charts, histograms, bar graphs, line graphs, pictographs, and circle graphs generated by appropriate technology, including calculators and computers.

Grade Level Expectations
The student:

Third Grade

1. uses a calculator to compare data.
2. in class projects, constructs and discusses patterns in computer-generated graphs using real-world problems (for example, identify most popular pizza topping).

Fourth Grade

1. uses a calculator to determine the range and mean of a set of data.
2. uses computer applications to examine and evaluate data.
3. uses computer applications to construct graphs.

Fifth Grade

1. uses a calculator to determine the range and mean of a set of data.
2. uses computer applications to examine and evaluate data.
3. uses computer applications to construct labeled graphs.
4. uses computer-generated spreadsheets to record and display real-world data.

Standard 2: The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.

Benchmark MA.E.2.2.1: The student uses models, such as tree diagrams, to display possible outcomes and to predict events.

Grade Level Expectations
The student:

Third Grade

1. determines the number of possible combinations of given items and displays them in an organized way (for example, lists all possible combinations of three shirts and two pairs of shorts).
2. represents all possible outcomes for a particular probability situation or event using models such as charts or lists.
3. calculates the probability of a particular event occurring from a set of all possible outcomes.

Fourth Grade

1. determines the number of possible combinations of given items and displays them in an organized way.
2. represents all possible outcomes for a simple probability situation or event using models such as organized lists, charts, or tree diagrams.
3. calculates the probability of a particular event occurring from a set of all possible outcomes.

Fifth Grade

1. determines the number of possible combinations of given items and displays them in an organized way.
2. represents all possible outcomes for a simple probability situation or event using models such as organized lists, charts, or tree diagrams.
3. calculates the probability of a particular event occurring from a set of all possible outcomes.

Benchmark MA.E.2.2.2: The student predicts the likelihood of simple events occurring.

Grade Level Expectations
The student:

Third Grade

1. identifies and records the possible outcomes of simple experiments using concrete materials (for example, spinners, marbles in a bag, coin toss).
2. determines which outcomes are most likely to occur in certain situations (for example, spinning red is most likely to occur when a spinner is divided equally among red, blue, green, and red).

Fourth Grade

1. identifies and records using common fractions, the possible outcomes of simple experiments using concrete materials (for example, spinners, number cubes, coin toss).
2. determines and predicts which outcomes are likely to occur and expresses those expected outcomes as fractions.
3. conducts experiments to test predictions.

Fifth Grade

1. identifies and records the possible outcomes of an experiment using concrete materials (for example, spinners, marbles, number cubes).
2. explains and predicts which outcomes are most likely to occur and expresses the probabilities as fractions.
3. conducts experiments to test predictions.

Standard 3: The student uses statistical methods to make inferences and valid arguments about real-world situations.

Benchmark MA.E.3.2.1: The student designs experiments to answer class or personal questions, collects information, and interprets the results using statistics (range, mean, median, and mode) and pictographs, charts, bar graphs, circle graphs, and line graphs.

Grade Level Expectations
The student:

Third Grade

1. designs appropriate questions for a survey.
2. creates a pictograph or bar graph to present data from a given survey.
3. explains the results from the data of a given survey.

Fourth Grade

1. designs a class survey to collect data.
2. creates an appropriate graph to display data (for example, pictographs, bar graphs, line graphs, circle graphs).
3. determines appropriate statistical measures for data (range, mean, median, mode).
4. explains the results using statistics (range and measures of central tendency).

Fifth Grade

1. designs a survey to collect data.
2. as a class project, discusses ways to choose a sample representative of a large group such as a sample representative of the entire school.
3. creates an appropriate graph to display data, including titles, labels, scales, and intervals.
4. interprets the results using statistics (range and measures of central tendency).

Benchmark MA.E.3.2.2: The student uses statistical data about life situations to make predictions and justifies reasoning.

Grade Level Expectations
The student:

Third Grade

1. uses statistical data to recognize trends.
2. applies statistical data to make generalizations.
3. explains generalizations.

Fourth Grade

1. uses statistical data to identify trends.
2. applies statistical data to make generalizations.
3. justifies and explains generalizations.

Fifth Grade

1. uses statistical data to predict trends.
2. applies statistical data to make generalizations.
3. justifies and explains generalizations.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Strand A: Number Sense, Concepts, and Operations

Standard 1: The student understands the different ways numbers are represented and used in the real world.

Benchmark MA.A.1.3.1: The student associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grade Level Expectations
The student:

Sixth Grade

1. knows word names and standard numerals for whole numbers, fractions, decimals (through hundred-thousandths), and percents.
2. reads and writes whole numbers and decimals in expanded form.

Seventh Grade

1. knows word names and standard numerals for integers, fractions, decimals, ratios, numbers expressed as percents, numbers with exponents, numbers expressed in scientific notation, and numbers expressed using the square root radical.
2. reads and writes whole numbers and decimals in expanded form, including exponential notation.

Eighth Grade

1. knows word names and standard numerals for integers, fractions, decimals, numbers expressed as percents, numbers with exponents, numbers expressed in scientific notation, absolute value, radicals, and ratios.

Benchmark MA.A.1.3.2: The student understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Grade Level Expectations
The student:

Sixth Grade

1. compares and orders fractions and decimals using graphic models, number lines, and symbols.
2. compares and orders fractions, decimals, and common percents.

Seventh Grade

1. compares and orders integers, fractions, decimals, numbers with exponents, and numbers

expressed as percents or in scientific notation, including ordering on a number line.

Eighth Grade

1. compares and orders fractions, decimals, integers, and radicals using graphic models, number lines, and symbols.
2. compares and orders numbers expressed in absolute value, scientific notation, integers, percents, numbers with exponents, fractions, decimals, radicals, and ratios.

Benchmark MA.A.1.3.3: The student understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.

Grade Level Expectations
The student:

Sixth Grade

1. knows examples of positive rational numbers in real-world situations.
2. describes the meanings of positive rational numbers using part/whole relationships and relative size comparisons in real-world situations.
3. constructs models to represent positive rational numbers.

Seventh Grade

1. knows examples of rational and irrational numbers in real-world situations, including the irrational numbers π and $\sqrt{2}$.
2. describes the meanings of rational and irrational numbers using physical or graphical displays.
3. constructs models to represent rational numbers.

Eighth Grade

1. knows examples of rational and irrational numbers in real-world situations.
2. describes the meanings of rational and irrational numbers using physical or graphical displays.
3. constructs models to represent rational and irrational numbers.

Benchmark MA.A.1.3.4: The student understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value.

Grade Level Expectations
The student:

Sixth Grade

1. knows the relationships among fractions, decimals, and percents.
2. expresses a given quantity in a variety of ways, such as fractions, decimals, or numbers expressed as percents.
3. knows whether numbers expressed in different forms are equal.
4. converts a number expressed in one form to its equivalent in another form.

Seventh Grade

1. knows the relationships among fractions, decimals, and percents.
2. expresses a given quantity in a variety of ways (for example, integers, fractions, decimals, numbers expressed as a percent, numbers expressed in scientific notation, ratios).
3. knows whether numbers expressed in different forms are equal.
4. converts a number expressed in one form to its equivalent in another form.

Eighth Grade

1. knows the relationships among fractions, decimals, and percents given a real-world context.
2. simplifies expressions using integers, exponents, and radicals.
3. knows equivalent forms of large and small numbers in scientific and standard notation.
4. identifies and explains the absolute value of a number.

Standard 2: The student understands number systems.

Benchmark MA.A.2.3.1: The student understands and uses exponential and scientific notation.

Grade Level Expectations
The student:

Sixth Grade

1. knows the meaning and use of exponential notation (for example 2^3=2X2X2=8).
2. expresses whole numbers in exponential notation or in factored form.
3. evaluates numerical expressions that contain exponential notation.

Seventh Grade

1. expresses whole numbers in exponential notation (for example, $36 = 6^2$).
2. evaluates numerical expressions that contain exponential notation.
3. expresses numbers greater than one in scientific notation.
4. expresses numbers in scientific notation as numbers in standard form.

Eighth Grade

1. expresses rational numbers in exponential notation including negative exponents (for example, $2^{-3} = ½^3 = 1/8$).
2. expresses numbers in scientific or standard notation including decimals between 0 and 1.
3. evaluates numerical or algebraic expressions that contain exponential notation.

Benchmark MA.A.2.3.2: The student understands the structure of number systems other than the decimal number system.

Grade Level Expectations
The student:

Sixth Grade

1. compares the decimal number system to systems that do not use place value (for example, Roman numeral, ancient Egyptian).

Seventh Grade

1. applies knowledge of the decimal number system and of non-place-value systems.

Eighth Grade

1. expresses base ten numbers as equivalent numbers in different bases, such as base two, base five, and base eight.
2. discusses the application of the binary (base two) number system in computer technology.
3. expresses non-base ten numbers as equivalent numbers in base ten.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Standard 3: The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.

Benchmark MA.A.3.3.1: The student understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers.

Grade Level Expectations
The student:

Sixth Grade

1. knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals.
2. uses models or pictures to show the effects of addition, subtraction, multiplication, and division, on whole numbers, decimals, fractions, and mixed numbers.
3. knows and applies the commutative, associative, and distributive properties in the addition and multiplication of rational numbers.
4. uses concrete models and real-world examples to explore the inverse relationship of positive and negative numbers.

Seventh Grade

1. knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals.
2. uses models or pictures to show the effects of addition, subtraction, multiplication, and division on whole numbers, decimals, fractions, mixed numbers, and integers.
3. applies the properties of rational numbers to solve problems (commutative, associative, distributive, identity, equality, inverse).
4. knows the inverse relationship of positive and negative numbers.

Eighth Grade

1. knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, decimals, and integers.
2. knows the inverse relationship of positive and negative numbers.
3. applies the properties of real numbers to solve problems (commutative, associative, distributive, identity, equality, inverse, and closure).

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Benchmark MA.A.3.3.2: The student selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.

Grade Level Expectations
The student:

Sixth Grade

1. knows the appropriate operations to solve real-world problems involving whole numbers, decimals, and fractions.
2. solves real-world problems involving whole numbers, fractions, decimals, and common percents using one or two-step problems.
3. applies order of operations when solving problems (parentheses, multiplication, division, addition, and subtraction).
4. knows proportional relationships and describes such relationships in words, tables, or graphs.

Seventh Grade

1. knows the appropriate operation to solve real-world problems involving fractions, decimals, and integers.
2. solves real-world problems involving decimals and fractions using two- or three-step problems.
3. solves real-world problems involving percents (for example, discounts, simple interest, taxes, tips).
4. applies order of operations to solve problems (parentheses, exponents, multiplication, division, addition, and subtraction).
5. knows proportional relationships and uses tables, graphs, or “constant ratio” relationships to solve and explain problems.

Eighth Grade

1. knows the appropriate operations to solve real-world problems involving integers, ratios, rates, proportions, numbers expressed as percents, decimals, and fractions.
2. solves real-world problems involving integers, ratios, proportions, numbers expressed as percents, decimals, and fractions in two- or three-step problems.
3. solves real-world problems involving percents including percents greater than 100% (for example percent of change, commission).
4. writes and simplifies expressions from real-world situations using the order of operations.

Benchmark MA.A.3.3.3: The student adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

Grade Level Expectations
The student:

Sixth Grade

1. solves one- or two-step real-world problems involving whole numbers and decimals using appropriate methods of computation (for example, mental computation, paper and pencil, and calculator).
2. justifies the choice of method for calculations, such as mental computation, concrete materials, algorithms, or calculators.

Seventh Grade

1. solves multi-step real-world problems involving whole numbers, fractions or decimals using appropriate methods of computation, such as mental computation, paper and pencil, and calculator.

Eighth Grade

1. solves multi-step real-world problems involving fractions, decimals, and integers using appropriate methods of computation, such as mental computation, paper and pencil, and calculator.

Standard 4: The student uses estimation in problem solving and computation.

Benchmark MA.A.4.3.1: The student uses estimation strategies to predict results and to check the reasonableness of results.

Grade Level Expectations
The student:

Sixth Grade

1. knows an appropriate estimation technique for a given situation using whole numbers (for example, clustering, compatible number, front-end).
2. estimates to predict results and to check reasonableness of results.
3. determines whether an exact answer is needed or an estimate would be sufficient.

Seventh Grade

1. knows an appropriate estimation technique for a given situation using whole numbers, fractions and decimals.
2. estimates to predict results and check reasonableness of results.
3. determines whether an exact answer is needed or an estimate would be sufficient.

Eighth Grade

1. knows appropriate estimation techniques for a given situation using real numbers.
2. estimates to predict results and to check reasonableness of results.

Standard 5: The student understands and applies theories related to numbers.

Benchmark MA.A.5.3.1: The student uses concepts about numbers, including primes, factors, and multiples, to build number sequences.

Grade Level Expectations
The student:

Sixth Grade

1. knows if numbers (less than or equal to 100) are prime or composite.
2. finds the greatest common factor and least common multiple of two or more numbers.
3. determines the prime factorization of a number less than or equal to 100.
4. uses divisibility rules.

Seventh Grade

1. knows if numbers are prime or composite.
2. finds the greatest common factor and least common multiple of two or more numbers.
3. determines the prime factorization of a composite number.
4. applies number theory concepts to determine the terms in a sequence.
5. applies number theory concepts, including divisibility rules, to solve real-world or mathematical problems.

Eighth Grade

1. knows if numbers are relatively prime.
2. applies number theory concepts to determine the terms in a real number sequence.
3. applies number theory concepts, including divisibility rules, to solve real-world or mathematical problems.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Strand B: Measurement
Standard 1: The student measures quantities in the real world and uses the measures to solve problems.

Benchmark MA.B.1.3.1: The student uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids and cylinders.

Grade Level Expectations
The student:

Sixth Grade

1. uses concrete and graphic models to create formulas for finding the perimeter and area of plane figures and the volume of rectangular solids.
2. uses concrete and graphic models to discover an approximation for π and creates a formula for finding circumference.

Seventh Grade

1. uses concrete or graphic models to create formulas for finding volumes of solids (prisms and cylinders).
2. uses concrete or graphic models to create formulas for finding surface area of prisms and cylinders.
3. solves and explains problems involving perimeter, area, and circumference.

Eighth Grade

1. uses concrete and graphic models to explore and derive formulas for surface area and volume of three-dimensional regular shapes, including pyramids, prisms, and cones.
2. solves and explains real-world problems involving surface area and volume of three-dimensional shapes.

Benchmark MA.B.1.3.2: The student uses concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.

Grade Level Expectations
The student:

Sixth Grade

1. identifies a protractor as a tool for measuring angles and measures angles using a protractor.
2. identifies and names angles according to their measure (including acute, right, obtuse, straight).

3. classifies triangles according to the measurement of their angles and according to the length of their sides.
4. determines the measure of a missing angle using angle relationships.

Seventh Grade

1. finds the measure of an angle by measuring with a protractor or applying angle relationships (for example, corresponding, complementary, supplementary, interior, exterior).
2. develops and uses the distance formula in solving real-world problems (d = rt).

Eighth Grade

1. applies formulas for finding rates, distance, time and angle measures.
2. describes and uses rates of change (for example, temperature as it changes throughout the day, or speed as the rate of change in distance over time) and other derived measures.

Benchmark MA.B.1.3.3: The student understands and describes how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume.

Grade Level Expectations
The student:

Sixth Grade

1. given a two-dimensional figure, creates a new figure by increasing or decreasing the original dimensions.
2. knows the relationship between the area or perimeter of an original figure and that of a newly created figure.
3. solves real-world or mathematical problems involving perimeter or area and how these are affected by changes in the dimensions of the figure.

Seventh Grade

1. given a two- or three-dimensional figure, creates a new figure by increasing or decreasing the original dimensions.
2. knows the relationships between the perimeters, areas, surface areas, or volumes of the original figure and those of the newly created figure.
3. solves real world or mathematical problems involving perimeter, area, circumference, surface area and volume and how these are affected by changes in the dimensions of the figures.

Eighth Grade

1. knows how a change in a figure's dimensions affects its perimeter, area, circumference, surface area, or volume.
2. knows how changes in the volume, surface area, area, or perimeter of a figure affect the dimensions of the figure.
3. solves real-world or mathematical problems involving the effects of changes either to the dimensions of a figure or to the volume, surface area, area, perimeter, or circumference of figures.

Benchmark MA.B.1.3.4: The student constructs, interprets, and uses scale drawings such as those based on number lines and maps to solve real-world problems.

Grade Level Expectations
The student:

Sixth Grade

1. knows proportional relationships in scale drawings.
2. uses scale drawings to solve real-world problems including distance (as in map reading).

Seventh Grade

1. knows an appropriate scale needed to produce a proportional drawing or model.
2. knows proportional relationships used in scale drawings.
3. produces a scale drawing.

Eighth Grade

1. interprets and applies various scales including those based on number lines, graphs, models, and maps. (Scale may include rational numbers.)
2. constructs and uses scale drawings to recreate a given situation.

Standard 2: The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).

Benchmark MA.B.2.3.1: The student uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.

Grade Level Expectations
The student:

Sixth Grade

1. compares objects according to their length, weight or mass, and capacity using customary or

metric units.

2. measures length, weight or mass, and capacity using appropriate measuring instruments.

Seventh Grade

1. measures length, weight or mass, and capacity or volume using customary or metric units.
2. knows relationships between metric units of mass and capacity (for example, one cubic centimeter of water weighs one gram).
3. finds measures of length, weight or mass, and capacity or volume using proportional relationships and properties of similar geometric figures (for example, using shadow measurement and properties of similar triangles to find the height of a flag pole).

Eighth Grade

1. finds measures of length, weight or mass, and capacity or volume using proportional relationships and properties of similar geometric figures.

Benchmark MA.B.2.3.2: The student solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system.

Grade Level Expectations
The student:

Sixth Grade

1. changes one customary or metric unit of measurement to another within the same system.
2. uses concrete manipulatives or constructs models of square units (such as square inch and square meter) for measuring area and cubic units (such as cubic centimeter or cubic yard) for measuring volume.

Seventh Grade

1. compares units of measurement within a system (metric or customary).
2. performs operations on measurements within either the metric or customary system (for example, finds three times 27 inches and expresses the answer in yards).
3. selects the appropriate unit of measurement when solving real-world problems (for example linear, square, and cubic units).
4. solves problems using the metric or customary system involving conversions within the same system.

Eighth Grade

1. solves problems using mixed units within each system, such as feet and inches, hours and minutes.
2. solves problems using the conversion of measurements within the customary system.

3. solves problems using the conversions of measurement within the metric system.

Standard 3: The student estimates measurements in real-world problem situations.

Benchmark MA.B.3.3.1: The student solves real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume, in either customary or metric units.

Grade Level Expectations
The student:

Sixth Grade

1. estimates the measure (length, weight or mass, and capacity) of an object or figure and then compares the estimate with the actual measurement of the object or figure.
2. knows whether an exact answer is needed or an estimate is sufficient.
3. estimates solutions to real-world problems by estimating the length, volume or capacity, weight or mass, perimeter, or area of objects or shapes in either customary or metric units.
4. estimates solutions to real-world problems involving measurement, including estimates of time, temperature and money.

Seventh Grade

1. knows whether an exact answer is needed or if an estimate is sufficient.
2. estimates solutions to real-world problems by estimating the length, volume or capacity, weight or mass, perimeter, or area of objects or shapes in either customary and metric units.
3. estimates solutions to real-world problems involving measurement, including estimates of time, temperature, and money.

Eighth Grade

1. knows a variety of strategies to estimate, describe, make comparisons, and solve real-world and mathematical problems involving measurements.

Standard 4: The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations.

Benchmark MA.B.4.3.1: The student selects appropriate units of measurement and determines and applies significant digits in a real-world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement).

Grade Level Expectations
The student:

Sixth Grade

1. selects the appropriate unit of measure for a given real-world situation.

2. knows the approximate nature of measurement and measures to the specified degree of accuracy (for example, nearest centimeter or sixteenth of an inch).

Seventh Grade

1. selects appropriate units of measurement in a real-world context.
2. knows that measurements are always approximate and that the degree of accuracy of a measurement depends upon the precision of the instrument.
3. knows the precision of different measuring instruments.
4. determines the appropriate precision unit for a given situation.

Eighth Grade

1. selects the appropriate unit of measure for a given situation.
2. knows the precision of different measuring instruments.
3. determines the appropriate precision unit for a given situation.
4. identifies the number of significant digits as it relates to the least precise unit of measure.
5. determines the greatest possible error of a given measurement and the possible actual measurements of an object.

Benchmark MA.B.4.3.2: The student selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.

Grade Level Expectations
The student:

Sixth Grade

1. selects an appropriate measurement tool (for example, scales, rulers, thermometers, measuring cups, protractors, gauges).
2. determines the interval of a scale and reads the scales on a variety of measuring instruments.
3. measures accurately with the measurement tools.

Seventh Grade

1. selects a measurement tool (for example, scales, rulers, thermometers, measuring cups, protractors, gauges) appropriate to a given situation.
2. measures accurately with the measurement tools to the specified degree of accuracy for the task and in keeping with the precision of the measurement tool.

Eighth Grade

1. applies significant digits in the real-world context.

2. selects and uses appropriate instruments, technology, and techniques to measure quantities and dimensions to a specified degree of accuracy.

Strand C: Geometry and Spatial Sense
Standard 1: The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.

Benchmark MA.C.1.3.1: The student understands the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two- and three-dimensions.

Grade Level Expectations
The student:

Sixth Grade

1. identifies, draws, and uses symbolic notation to denote the attributes of two-dimensional geometric figures (including points, parallel and perpendicular lines, planes, rays, and parts of a circle).
2. knows and draws angles (including acute, obtuse, right, and straight).
3. analyzes relationships among two-dimensional geometric figures (for example, the diagonal of a rectangle divides the rectangle into two congruent triangles each having one half the area of the rectangle).
4. uses appropriate measuring devices (including ruler and protractor) as needed in analysis of figures.
5. knows the attributes of and draws three-dimensional figures (including rectangular solids and cylinders).
6. knows the properties of two- and three-dimensional figures.

Seventh Grade

1. identifies, draws, and uses symbolic notation to denote the basic properties of geometric terms including lines (intersecting, skew, parallel, perpendicular) and congruent figures.
2. determines the measure of various types of angles using a protractor or angle relationships (including complementary, supplementary, and vertical angles).
3. compares and describes the attributes of regular and irregular polygons (for example, parallelogram, trapezoid, pentagon, hexagon).
4. identifies and classifies triangles and quadrilaterals.
5. knows the attributes of and draws three-dimensional figures (pyramid, cone, sphere, hemisphere).
6. knows the properties of two- and three-dimensional figures.

Eighth Grade

1. determines and justifies the measures of various types of angles based upon geometric relationships in two- and three-dimensional shapes.
2. compares regular and irregular polygons and two- and three-dimensional shapes.
3. draws and builds three-dimensional figures from various perspectives (for example, flat patterns, isometric drawings, nets).
4. knows the properties of two- and three-dimensional figures.

Standard 2: The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.

Benchmark MA.C.2.3.1: The student understands the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.

Grade Level Expectations
The student:

Sixth Grade

1. uses manipulatives and drawings to solve problems requiring spatial visualization.
2. describes and applies the property of symmetry in figures.
3. recognizes and draws congruent and similar figures.
4. identifies and performs the various transformations (reflection, translation, rotation) of a given figure on a coordinate plane.

Seventh Grade

1. uses manipulatives and drawings to solve problems requiring spatial visualization.
2. describes and applies the properties of parallelism, perpendicularity and symmetry in real-world contexts.
3. recognizes, draws, and describes congruent and similar figures.
4. creates and describes the attributes of a figure either congruent or similar to a given figure.
5. identifies and performs the various transformations (reflection, translation, rotation) of a given figure on a coordinate plane.

Eighth Grade

1. use the properties of parallelism, perpendicularity, and symmetry in solving real-world problems.
2. identifies congruent and similar figures in real-world situations and justifies the identification.
3. identifies and performs the various transformations (reflection, translation, rotation, dilation)

of a given figure on a coordinate plane.

Benchmark MA.C.2.3.2: The student predicts and verifies patterns involving tessellations (a covering of a plane with congruent copies of the same pattern with no holes and no overlaps, like floor tiles).

Grade Level Expectations
The student:

Sixth Grade

1. constructs tiling patterns to cover a plane.
2. identifies a tessellation.
3. identifies geometric shapes that can be tessellated.
4. tessellates using translation and other desired transformations.

Seventh Grade

1. predicts and verifies whether a given shape or shapes will tessellate.
2. given a simple tessellated pattern, determines the shape(s) and transformation(s).
3. tessellates using reflection, translation, or rotation and any desired combinations.

Eighth Grade

1. continues a tessellation pattern using the needed transformations.
2. creates an original tessellating tile and tessellation pattern using a combination of transformations

Standard 3: The student uses coordinate geometry to locate objects in both two- and three-dimensions and to describe objects algebraically.

Benchmark MA.C.3.3.1: The student represents and applies geometric properties and relationships to solve real-world and mathematical problems.

Grade Level Expectations
The student:

Sixth Grade

1. observes, explains, and makes conjectures regarding geometric properties and relationships (among angles, triangles, squares, rectangles, parallelograms).
2. applies known geometric properties (for example, symmetry, congruence) to solve real-world

and mathematical problems.

Seventh Grade

1. observes, explains, and makes conjectures regarding geometric properties and relationships (among angles, lines, regular and irregular polygons).
2. creates and solves angle measurement problems for triangles.
3. demonstrates the Pythagorean relationship in right triangles using models or diagrams (for example, manipulatives, dot, graph, or isometric paper).
4. given two sides of a right triangle, uses the Pythagorean Theorem to find the length of the third side.

Eighth Grade

1. observes, explains, makes and tests conjectures regarding geometric properties and relationships (among regular and irregular shapes of two and three dimensions).
2. applies the Pythagorean Theorem in real-world problems (for example, finds the relationship among sides in $45^o - 45^o$ and $30^o - 60^o$ right triangles).

Benchmark MA.C.3.3.2: The student identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines.

Grade Level Expectations
The student:

Sixth Grade

1. identifies the x and y axes in a coordinate plane and identifies the coordinates of a given point in the first quadrant.
2. plots specific points in the first quadrant of the Cartesian coordinate system.

Seventh Grade

1. identifies each quadrant and the characteristics of points in each quadrant (positive and negative).
2. identifies and plots ordered pairs in all four quadrants of the coordinate system.

Eighth Grade

1. given an equation or its graph, finds ordered-pair solutions (for example, $y = 2x$).
2. given the graph of a line, identifies the slope of the line (including the slope of vertical and horizontal lines).
3. given the graph of a linear relationship, applies and explains the simple properties of lines on a graph, including parallelism, perpendicularity, and identifying the x and y intercepts, the midpoint of a horizontal or vertical line segment, and the intersection point of two lines.

Strand D: Algebraic Thinking
Standard 1: The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.

Benchmark MA.D.1.3.1: The student describes a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, equations, and inequalities.

Grade Level Expectations
The student:

Sixth Grade

1. describes, predicts, and creates numerical and geometric patterns through models (for example, manipulatives, tables, graphs).
2. states in words a rule for a pattern.
3. predicts outcomes based on patterns.
4. finds patterns in real-world situations.
5. describes relationships and patterns using words, tables, symbols, variables, expressions, or equations.
6. given initial terms in a pattern, supplies a specific missing term in the pattern (for example, given first four terms, supplies **Sixth** term).

Seventh Grade

1. uses manipulatives and graphic materials to generate tables and charts (for example, input, output) to develop algebraic expressions, equations, or formulas.
2. given instances of a pattern, expresses a generalization of the pattern using algebraic expressions.
3. given an algebraic expression of a relationship or pattern, supplies specific instances of the relationship or pattern.
4. predicts outcomes based on a generalization of a pattern or relationship.

Eighth Grade

1. reads, analyzes, and describes graphs of linear relationships.

2. uses variables to represent unknown quantities in real-world problems.
3. uses the information provided in a table, graph, or rule to determine if a function is linear and justifies reasoning.
4. finds a function rule to describe tables of related input-output variables.
5. predicts outcomes based upon function rules.

Benchmark MA.D.1.3.2: The student creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.

Grade Level Expectations
The student:

Sixth Grade

1. interprets and creates function tables and graphs (first quadrant).
2. substitutes values for variables in expressions and describes the results or patterns observed.
3. graphs (first quadrant) functions from function tables to explain cause-and-effect relationships.

Seventh Grade

1. interprets and creates tables, function tables, and graphs (all four quadrants).
2. writes expressions and equations to describe relationships.
3. graphs equations to explain cause-and-effect relationships.

Eighth Grade

1. interprets and creates tables and graphs (function tables).
2. writes equations and inequalities to express relationships.
3. graphs equations and inequalities to explain cause-and-effect relationships.
4. interprets the meaning of the slope of a line from a graph depicting a real-world situation.

Standard 2: The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.

Benchmark MA.D.2.3.1: The student represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities.

Grade Level Expectations
The student:

Sixth Grade

1. uses variables to represent numbers and relationships.

2. translates verbal expressions into algebraic expressions.
3. translates simple algebraic expressions, equations or formulas representing real-world relationships into verbal expressions or sentences.
4. uses pictures, models, manipulatives or other strategies to solve simple one-step linear equations with rational solutions.

Seventh Grade

1. translates verbal expressions and sentences into algebraic expressions and equations.
2. translates algebraic expressions, equations, or formulas representing real-world relationships into verbal expressions or sentences.
3. given an algebraic equation or expression of a real-world application, substitutes integral values for variables and simplifies the results.
4. uses pictures, models, manipulatives or other strategies to solve one-step and simple multi-step linear equations.
5. graphs solutions to equations and inequalities on a number line.
6. graphs linear equations on the coordinate plane from a table of values.

Eighth Grade

1. translates verbal expressions and sentences into algebraic expressions, equations, and inequalities.
2. translates algebraic expressions, equations, or inequalities representing real-world relationships into verbal expressions or sentences.
3. solves single- and multiple-step linear equations and inequalities in concrete or abstract form.
4. graphs linear equations on the coordinate plane using tables of values.
5. graphically displays real-world situations represented by algebraic equations or inequalities.
6. evaluates algebraic expressions, equations, and inequalities by substituting integral values for variables and simplifying the results.
7. simplifies algebraic expressions that represent real-world situations by combining like terms and applying the properties of real numbers.

Benchmark MA.D.2.3.2: The student uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.

Grade Level Expectations
The student:

Sixth Grade

1. knows how to solve simple equations representing real-world situations, using pictures, models, manipulatives (such as algebra tiles), or other strategies.
2. uses concrete materials to solve equations and inequalities and explains reasoning orally or in writing.

Seventh Grade

1. knows how to solve linear equations and inequalities representing real-world situations, using pictures, models, manipulatives (such as algebra tiles), or other strategies.
2. simplifies algebraic expressions with one variable.

Eighth Grade

1. simplifies algebraic expressions with a maximum of two variables.
2. solves single- and multi-step linear equations and inequalities that represent real-world situations.

Strand E: Data Analysis and Probability
Standard 1: The student understands and uses the tools of data analysis for managing information.

Benchmark MA.E.1.3.1: The student collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, bar graphs, to determine how different ways of presenting data can lead to different interpretations.

Grade Level Expectations
The student:

Sixth Grade

1. reads and analyzes data displayed in a variety of forms (charts, pictographs, stem-and-leaf plots).
2. generates and collects data for analysis.
3. chooses appropriate titles, scales, labels, keys, and intervals for displaying data in graphs.
4. constructs, interprets, and explains displays of data, such as tables and graphs (single- and multiple-bar graphs and single- and multiple- line graphs).

Seventh Grade

1. generates and collects data for analysis.
2. interprets and analyzes data presented in a variety of forms, including box-and-whisker graphs and scatter plots.
3. constructs, interprets, and explains displays of data, such as tables and graphs (circle graphs, single- and multiple- bar graphs, and single and multiple-line graphs) and explains how

different displays of data lead to different interpretations.

Eighth Grade

1. reads and interprets data displayed in a variety of forms including histograms.
2. constructs and interprets displays of data, (including circle, line, bar, and box-and-whisker graphs) and explains how different displays of data can lead to different interpretations.

Benchmark MA.E.1.3.2: *The student understands and applies the concepts of range and central tendency (mean, median, and mode).*

Grade Level Expectations
The student:

Sixth Grade

1. organizes items in a set of data.
2. finds the range, mean, median, and mode of a set of data.
3. describes real-world data by applying and explaining appropriate procedures for finding measures of central tendency.

Seventh Grade

1. finds the range, mean, median, and mode of data from a table, chart, or graph.
2. draws conclusions from an analysis of range and central tendency of a set of real-world data.

Eighth Grade

1. finds the mean, median, and mode of a set of data using raw data, tables, charts, or graphs.
2. interprets measures of dispersion (range) and of central tendency.
3. determines appropriate measures of central tendency for a given situation or set of data.

Benchmark MA.E.1.3.3: The student analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.

Grade Level Expectations
The student:

Sixth Grade

1. describes a set of data by using the measures of central tendency.
2. uses technology, such as graphing calculators and computer spreadsheets, to create graphs.

Seventh Grade

1. applies and analyzes appropriate measures of central tendency (mode, mean, median, range)

for a set of data.

2. uses technology, such as graphing calculators and computer spreadsheets, to analyze data and create graphs.

Eighth Grade

1. determines the mean, median, mode, and range of a set of real-world data using appropriate technology.
2. organizes, graphs and analyzes a set of real-world data using appropriate technology.

Standard 2: The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.

Benchmark MA.E.2.3.1: The student compares experimental results with mathematical expectations of probabilities.

Grade Level Expectations
The student:

Sixth Grade

1. determines all possible outcomes of an event using a tree diagram or organized list.
2. calculates simple mathematical probabilities.
3. uses manipulatives to obtain experimental results, compares results to mathematical expectations, and discusses the validity of the experiment.

Seventh Grade

1. obtains experimental results using manipulatives.
2. explains observed difference between mathematical and experimental results.
3. calculates simple mathematical probabilities for independent and dependent events.

Eighth Grade

1. compares and explains the results of an experiment with the mathematically expected outcomes.
2. calculates simple mathematical probabilities for independent and dependent events.

Benchmark MA.E.2.3.2: The student determines odds for and odds against a given situation.

Grade Level Expectations
The student:

Sixth Grade

1. examines and describes situations that include finding the odds for and against a specified outcome.

Seventh Grade

1. computes the mathematical odds for and against a specified outcome in given real-world experiments.

Eighth Grade

1. predicts the mathematical odds for and against a specified outcome in a given real-world situation.

Standard 3: The student uses statistical methods to make inferences and valid arguments about real-world situations.

Benchmark MA.E.3.3.1: The student formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts.

Grade Level Expectations
The student:

Sixth Grade

1. with classmates, formulates hypotheses based on research and prior data, designs an appropriate experiment, collects and analyses data using appropriate statistics, and displays and interprets results in appropriate tables or graphs.

Seventh Grade

1. formulates a hypothesis and designs an experiment.
2. performs the experiment and collects, organizes, and displays the data.
3. evaluates the hypothesis by making inferences and drawing conclusions based on statistical results.

Eighth Grade

1. formulates a hypothesis and designs an experiment.
2. performs the experiment and collects, organizes, and displays the data.
3. evaluates the hypothesis by making inferences and drawing conclusions based on statistical results.

Benchmark MA.E.3.3.2: The student identifies the common uses and misuses of probability or statistical analysis in the everyday world.

Sunshine State Standards

Grade Level Expectations

Mathematics K-8

Grade Level Expectations
The student:

Sixth Grade

1. explores uses and misuses of statistics in real-world situations such as advertisements and polls.

Seventh Grade

1. knows appropriate uses of statistics and probability in real-world situations.
2. knows when statistics and probability are used in misleading ways.

Eighth Grade

1. knows appropriate uses of statistics and probability in real-world situations.
2. knows when statistics and probability are used in misleading ways.
3. identifies and uses different types of sampling techniques (for example, random, systematic, stratified).
4. knows whether a sample is biased.

Florida
COURSE DESCRIPTION - GRADES 6-8

Subject Area: Academics - Subject Areas
Course Number: 7812010
Course Title: Mathematics: 6-8

A. **Major Concepts/Content.** The purpose of this course is to provide instruction in mathematics concepts and procedures to enable students with disabilities to function at their highest levels, participate effectively in the community, and prepare for a career.

The content should include, but not be limited to, the following:

- number systems, including whole numbers, fractions, and decimals
- number operations and computation
- measurement concepts in length, weight, volume, time, and money
- geometric concepts
- algebraic concepts, including problem solving
- probability and chance
- use of calculators

This course shall integrate the Sunshine State Standards and Goal 3 Student Performance Standards of the Florida System of School Improvement and Accountability as appropriate to the individual student and to the content and processes of the subject matter. Students with disabilities shall:

CL.A.1.In.1 complete specified Sunshine State Standards with modifications as appropriate for the individual student.

CL.A.1.Su.1 complete specified Sunshine State Standards with modifications and guidance and support as appropriate for the individual student.

B. **Special Note.** This entire course may not be mastered in one year. The particular course requirements that the student should master each year must be specified on an individual basis.

This course is designed to reflect, but not replicate, many of the requirements for Grades 6-8 mathematics in the basic education program. For students who are preparing to pursue a standard diploma, course requirements should incorporate

content and benchmarks from the Sunshine State Standards for Mathematics, Grades 6-8.

This course is primarily designed for students functioning at independent and supported levels. Students functioning at independent levels are generally capable of working and living independently and may need occasional assistance. Students functioning at supported levels are generally capable of living and working with ongoing supervision and support. Three levels of functioning, independent, supported, and participatory, have been designated to provide a way to differentiate benchmarks and course requirements for students with diverse abilities. Individual students may function at one level across all areas, or at several different levels, depending on the requirements of the situation.

This course may also be used to accommodate the wide range of abilities within the population of students with disabilities. The particular benchmark for a course requirement should be selected for individual students based on their levels of functioning and their desired post-school outcomes.

The level of functioning should be determined for each course requirement or performance objective. The key to determining the level is consideration of the amount of additional support and assistance that *must* be provided for the student. This support and assistance must be *beyond* what is typically provided for nondisabled individuals in performing the same type of behaviors or tasks. The following guidelines may be used to assist this process.

- For requirements/objectives mastered at the Independent Level, students are expected to be able to perform the behaviors identified for each benchmark *on their own* once they have mastered the knowledge and skills.
- For requirements/objectives mastered at the Supported Level, mastery should be determined with consideration of the amount and type of *guidance and support* necessary to the student to perform the behavior. This generally consists of some type of prompting or supervision.

  Physical prompt—a touch, pointing, or other type of gesture as a reminder

  Verbal prompt—a sound, word, phrase, or sentence as a reminder

  Visual prompt—color-coding, icons, symbols, or pictures as a reminder

  Assistive technology—an alarm, an electronic tool

  Supervision—from occasional inspection to continuous observation
- For requirements/objectives mastered at the Participatory Level, mastery should be determined with consideration of the amount and type of *assistance* necessary to the student to participate in the performance of the behavior.

  Physical assistance—from a person, such as full physical manipulation or partial movement assistance

Assistive technology—full: props, bolsters, pads, electric wheelchair; partial: straps, lapboards, adapted utensils

The performance objectives are designed to provide teachers with ideas for short-term objectives for instructional planning. The performance objectives are not intended to be exhaustive of all the possible short-term objectives a student may need in this course. Other objectives should be added as required by an individual student.

Instructional activities involving practical applications of course requirements may occur in naturalistic settings in home, school, and community for the purposes of practice, generalization, and maintenance of skills. These applications may require that the student acquire the knowledge and skills involved with the use of related technology, tools, and equipment.

C. Course Requirements. These requirements include, but are not limited to, the benchmarks from the Sunshine State Standards for Special Diploma that are most relevant to this course. Students are expected to make progress, but are not required to master benchmarks listed for this course. Benchmarks correlated with a specific course requirement may also be addressed by other course requirements as appropriate. Some requirements in this course are not fully addressed in the Sunshine State Standards for Special Diploma.

After successfully completing this course, the student will:

1. Demonstrate knowledge of number systems and concepts including whole numbers, fractions, and decimals.

CL.B.3.In.2	identify mathematical concepts and processes to solve problems.
CL.B.3.Su.2	identify mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:

___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other: _____

Numbers

Mathematics: 6-8

1.1. Identify equal and unequal quantities to accomplish functional tasks (e.g., cutting a sandwich in half, sharing a plate of cookies, mixing water and vinegar for cleaning, dealing cards for a game). (CL.B.3.In.1, CL.B.3.Su.1)

1.2. Identify whole numbers to accomplish functional tasks (e.g., finding pages in a book, finding a street address, reading speed limit signs, reading temperature gauges, identifying the cost of a house, identifying bus numbers, giving account numbers). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ to 10 _____ ❑ to 100 _____ ❑ to 1000 _____ ❑ to 10,000 _____ ❑ to 100,000

1.3. Count objects to accomplish functional tasks (e.g., home—counting silverware for setting the table, getting towels for guests; leisure—counting number of seconds to go in a basketball game). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ to 10 _____ ❑ to 100 _____ ❑ to 1000

1.4. Use skip counting to accomplish functional tasks (e.g., counting large numbers of objects, counting money, counting items in inventory, counting off individuals to form teams, identifying odd and even numbers, searching for a street number—all buildings on one side of the street have odd numbers). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ by 2s _____ ❑ by 5s _____ ❑ by 10s _____ ❑ by 100s

1.5. Identify the whole number that comes before, after, or between a given number(s) to accomplish functional tasks (e.g., locating the date after a holiday on a calendar, searching for a book in the library according to number, filing charts by numerical order). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ to 10 _____ ❑ to 100 _____ ❑ to 1000 _____ ❑ to 10,000 _____ ❑ to 100,000

1.6. Compare numbers to accomplish functional tasks (e.g., placing numbered pages in the correct order, comparing prices, comparing rental rates for apartments, comparing scores in a game to determine the winning team). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ to 10 _____ ❑ to 100 _____ ❑ to 1000 _____ ❑ to 10,000 _____ ❑ to 100,000

1.7. Identify objects in a series by ordinal position to accomplish functional tasks (e.g., identifying the third game in a playoff, identifying the second sentence in a paragraph, identifying the third frame in bowling, identifying the last pay period of the year). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ first, middle, last _____ ❑ to 5th _____ ❑ to 10th _____ ❑ to 100th

1.8. Identify the meaning of numerals when completing functional tasks (e.g., reading a street sign). (CL.B.1.In.1, CL.B.1.Su.1)
Specify range: 0-n _____

1.9. Write numerals when completing functional tasks (e.g., making an inventory). (CL.B.2.In.1, CL.B.2.Su.1)

Mathematics: 6-8

Specify range: 0-n _____

1.10. Identify the meaning of number words when completing functional tasks (e.g., reading a newsletter, reading an amount on a check). (CL.B.1.In.1, CL.B.1.Su.1)
Specify range: 0-n _____

1.11. Identify the meaning of ordinal number words when completing functional tasks (e.g., identifying who is first in line, identifying what place a runner finished in, identifying when it is your turn). (CL.B.1.In.1, CL.B.1.Su.1)
Specify range: first-nth _____

Place Value

1.12. Use knowledge of place value for whole numbers and decimals to accomplish functional tasks (e.g., lining up whole numbers and decimals for solving computation problems, reading and writing large numbers correctly, identifying the meaning of a number on a digital gauge or clock). (CL.B.3.In.2, CL.B.3.Su.2)

Specify whole numbers:	_____ ❑ 1s	_____ ❑ 10s	_____ ❑ 100s
	_____ ❑ 1000s	_____ ❑ 10,000s	_____ ❑ 100,000s
Specify decimals:	_____ ❑ tenths	_____ ❑ hundredths	_____ ❑ thousandths

1.13. Round whole numbers and decimals to accomplish functional tasks (e.g., estimating distance when traveling, estimating time left for an activity, estimating cost of purchases). (CL.B.3.In.2, CL.B.3.Su.2)

Specify whole numbers:	_____ ❑ 1s	_____ ❑ 10s	_____ ❑ 100s
	_____ ❑ 1000s	_____ ❑ 10,000s	_____ ❑ 100,000s
Specify decimals:	_____ ❑ tenths	_____ ❑ hundredths	_____ ❑ thousandths

Fractions/Decimals/Percents

1.14. Identify the meaning of fractional parts of an object, area, or set of items to accomplish functional tasks (e.g., measuring 1/3 cup of milk, cutting a pie into eighths, cutting a piece of wood in half, determining what fraction of the students are girls). (CL.B.3.In.1, CL.B.3.Su.1)

Specify: _____ ❑ halves _____ ❑ thirds _____ ❑ fourths _____ ❑ fifths
_____ ❑ sixths _____ ❑ eighths _____ ❑ tenths _____ ❑ twelfths
_____ ❑ other: _____

1.15. Identify the meaning of mixed numbers with fractions to accomplish functional tasks (e.g., measuring the length of an object or area, identifying lapsed time). (CL.B.3.In.1, CL.B.3.Su.1)

1.16. Identify the decimal equivalent of a percent (e.g., 98% = .98, 32% = .32) to accomplish functional tasks (e.g., multiplying and dividing percentages to calculate discounts, finding the average of test grades, finding 15% gratuity on a bill). (CL.B.3.In.1, CL.B.3.Su.1)

Mathematics: 6-8

1.17. Identify the decimal equivalent of a fraction to accomplish functional tasks (e.g., determining discounts—half off, calculating savings at a sale). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ 1/2 = 50% _____ ❑ 1/4 = 25% _____ ❑ 3/4 = 75%
_____ ❑ 1/3 = 33% _____ ❑ 2/3 = 67% _____ ❑ other: _____

1.18. Identify the meaning of numerals with decimals and percents when completing functional tasks (e.g., reading a sale sign, reading a digital clock). (CL.B.1.In.1, CL.B.1.Su.1)
Specify range: 0-n _____

1.19. Write numerals with decimals and percents when completing functional tasks (e.g., listing the cost of items). (CL.B.2.In.1, CL.B.2.Su.1)

1.20. Identify the meaning of numerals with fractions when completing functional tasks (e.g., reading a recipe). (CL.B.1.In.1, CL.B.1.Su.1)

1.21. Write numerals with fractions when completing functional tasks (e.g., writing a recipe, making a building plan). (CL.B.2.In.1, CL.B.2.Su.1)

2. Use estimation in problem solving and computation.

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other:
_____

2.1. Estimate the number of objects in a set and compare the estimate with the actual number to accomplish functional tasks (e.g., dishes needed for a dinner party, pencils to distribute to a class, baseballs in a bag to play a game). (CL.B.3.In.2, CL.B.3.Su.2)

2.2. Estimate, by first rounding numbers, the solution to computation problems to accomplish functional tasks (e.g., rounding prices to obtain a subtotal of items before purchasing, estimating how much money is needed for gas to fill a gas tank, estimating the hourly rate of automobile speed). (CL.B.3.In.2, CL.B.3.Su.2)

2.3. Estimate the length, width, or height of an object or area to accomplish functional tasks (e.g., estimating the width of a box to see if it can be moved through a door, estimating the height of a chair for a desk, estimating the width and length of a frame for a picture). (CL.B.3.In.2, CL.B.3.Su.2)

Mathematics: 6-8

2.4. Estimate the solution to problems involving money to accomplish functional tasks (e.g., estimating the cost of electricity for a year, estimating the total cost of groceries for a week). (CL.B.3.In.2, CL.B.3.Su.2)

2.5. Estimate the solution to problems involving time to accomplish functional tasks (e.g., estimating the time it will take to reach a destination, estimating the amount of time involved in completing each step of an assignment). (CL.B.3.In.2, CL.B.3.Su.2)

2.6. Estimate the solution to problems involving capacity or volume to accomplish functional tasks (e.g., selecting the right-sized bowl to use in cooking). (CL.B.3.In.2, CL.B.3.Su.2)

2.7. Estimate the solution to problems involving weight when completing functional tasks (e.g., estimating how much fruit must be purchased, estimating weight of food when dieting, estimating weight that can be lifted when working out). (CL.B.3.In.2, CL.B.3.Su.2)

3. Add and subtract whole numbers, decimals, and fractions to solve problems related to real world situations.

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:

___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other: _____

Addition

3.1. Identify the meaning of the concept of addition (e.g., totaling, summing up, putting together, depositing, plus sign [+]). (CL.B.3.In.1, CL.B.3.Su.1)

3.2. Identify situations in daily living when addition is used (e.g., totaling distances traveled over several days, determining the number of members on both teams, determining how much inventory was sold). (CL.B.3.In.1, CL.B.3.Su.1)

3.3. Add numbers accurately to accomplish functional tasks. (CL.B.3.In.1, CL.B.3.Su.1)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ decimals _____ ❑ fractions, mixed numbers
_____ ❑ without regrouping _____ ❑ with regrouping

Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus

Mathematics: 6-8

_____ ❑ uses a calculator _____ ❑ other: _____

3.4. Solve problems involving addition of whole numbers to accomplish functional tasks (e.g., counting paper money, adding amount of money spent from checkbook in one month, determining a monthly budget, adding number of hours worked in a pay period, adding weight gained in two months). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

3.5. Solve problems involving addition of numbers with decimals to accomplish functional tasks (e.g., totaling prices). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

3.6. Solve problems involving addition of numbers with fractions to accomplish functional tasks (e.g., determining how much fencing is needed for a garden, determining how much border paper is needed to fit the wall, doubling a recipe). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ like denominators _____ ❑ unlike denominators
_____ ❑ mixed numbers

Subtraction

3.7. Identify the meaning of the concept of subtraction (e.g., deducting, taking away, withdrawal, loss, minus sign [-]). (CL.B.3.In.1, CL.B.3.Su.1)

3.8. Identify situations in daily living when subtraction is used (e.g., determining how many newspapers are left to deliver, comparing the difference in sizes of classes, determining how many hours are left to work, determining how many miles are left to drive). (CL.B.3.In.1, CL.B.3.Su.1)

3.9. Subtract numbers accurately to accomplish functional tasks. (CL.B.3.In.1, CL.B.3.Su.1)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ decimals _____ ❑ fractions, mixed numbers
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

Mathematics: 6-8

3.10. Solve problems involving subtraction of whole numbers to accomplish functional tasks (e.g., determining how much weight was lost last year, determining how much farther one trip is compared to another, determining by how many points one team beat another). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

3.11. Solve problems involving subtraction of numbers with decimals to accomplish functional tasks (e.g., subtracting the value of outstanding checks when balancing a checkbook, determining the amount of change to give to a customer). (CL.B.3.In.2, CL.B.3.Su.2)

3.12. Solve problems involving subtraction of numbers with fractions to accomplish functional tasks (e.g., determining how much faster one classmate ran in a race compared to another, determining how much greater the width of the room is than the length). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ like denominators _____ ❑ unlike denominators
_____ ❑ mixed numbers

4. Multiply and divide whole numbers, decimals, and fractions to solve problems related to real world situations.

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other: _____

Multiplication

4.1. Identify the meaning of the concept of multiplication (e.g., compound, double, triple, times, multiplication sign [x]). (CL.B.3.In.1, CL.B.3.Su.1)

4.2. Identify situations in daily living when multiplication is used (e.g., determining the total cost of tickets for a group, determining how many people eight buses can hold). (CL.B.3.In.1, CL.B.3.Su.1)

4.3. Multiply numbers accurately to accomplish a functional task. (CL.B.3.In.1, CL.B.3.Su.1)

Specify: _____ ❑ single digit _____ ❑ multiple digits

Mathematics: 6-8

_____ ❑ decimals _____ ❑ fractions, mixed numbers
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

4.4. Solve problems involving multiplication of whole numbers to accomplish functional tasks (e.g., determining how many tickets are needed for a family of four to attend eight games, determining the total amount paid on a loan). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

4.5. Multiply numbers with decimals to accomplish functional tasks (e.g., calculating cost of tax, determining amount of tax on an item, determining amount to tip a waiter, determining amount of discount from a sale). (CL.B.3.In.2, CL.B.3.Su.2)

4.6. Multiply numbers with fractions to accomplish functional tasks (e.g., determining amount of discount from a sale, calculating how many square yards for new carpet, determining overtime if salary equals time and a half). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ like denominators _____ ❑ unlike denominators
_____ ❑ mixed numbers

Mathematics: 6-8

Division

4.7. Identify the meaning of the concept of division (e.g., portion, distribution, allocation, fraction, part, divided by, division sign [÷]). (CL.B.3.In.1, CL.B.3.Su.1)

4.8. Identify situations in daily living when division is used (e.g., calculating grade percentages, dividing students into groups, dividing money owed for a large purchase over a period of months). (CL.B.3.In.1, CL.B.3.Su.1)

4.9. Divide numbers accurately to accomplish functional tasks. (CL.B.3.In.1, CL.B.3.Su.1)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ decimals _____ ❑ fractions, mixed numbers
_____ ❑ without regrouping _____ ❑ with regrouping
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

4.10. Solve problems involving division of whole numbers to accomplish functional tasks (e.g., determining how much profit was made per job, determining how long a trip would take if a car traveled at a given speed, determining cost per person for expenses on a trip). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ single digit _____ ❑ multiple digits
_____ ❑ without remainders _____ ❑ with remainders
Specify method: _____ ❑ mentally _____ ❑ uses a table or chart
_____ ❑ uses counters or tallies _____ ❑ uses an abacus
_____ ❑ uses a calculator _____ ❑ other: _____

4.11. Divide numbers with decimals to accomplish functional tasks (e.g., budgeting monthly savings to reach annual goal, determining the package that has the lowest cost per unit). (CL.B.3.In.2, CL.B.3.Su.2)

4.12. Divide numbers with fractions to accomplish functional tasks (e.g., determining how many tiles are needed for a border). (CL.B.3.In.2, CL.B.3.Su.2)

Specify: _____ ❑ like denominators _____ ❑ unlike denominators
_____ ❑ mixed numbers

4.13. Solve problems involving averages to accomplish functional tasks (e.g., calculating final grade using test scores, calculating the batting average of a baseball player, calculating the average amount of sales per day). (CL.B.3.In.2, CL.B.3.Su.2)

Mathematics: 6-8

5. Demonstrate functional knowledge of ratio, proportion, and percent (e.g., simple interest, composition of liquids, size of objects).

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:

___ physical prompt ___ verbal prompt ___ visual prompt

___ assistive technology ___ supervision ___ other: _____

5.1. Identify the meaning of the concept of percent (e.g., divided by 100, percent sign [%]). (CL.B.3.In.1, CL.B.3.Su.1)

5.2. Identify situations in daily living when percent is used (e.g., calculating grades, sales prices and interest; charting growth by percentage increase or decrease). (CL.B.3.In.1, CL.B.3.Su.1)

5.3. Solve problems with numbers expressed as percents to accomplish functional tasks. (CL.B.3.In.2, CL.B.3.Su.2)

5.4. Identify the meaning of the concept of ratio (e.g., relation in number or quantity between things). (CL.B.3.In.1, CL.B.3.Su.1)

5.5. Identify situations in daily living when ratio is used (e.g., mixing cleaning solutions). (CL.B.3.In.1, CL.B.3.Su.1)

5.6. Solve problems involving ratios to accomplish functional tasks. (CL.B.3.In.2, CL.B.3.Su.2)

5.7. Identify the meaning of the concept of proportion (e.g., relation in number or quantity of one part to another). (CL.B.3.In.1, CL.B.3.Su.1)

5.8. Identify situations in daily living when proportion is used (e.g., scale drawings used in interior design). (CL.B.3.In.1, CL.B.3.Su.1)

5.9. Solve problems involving proportions to accomplish functional tasks. (CL.B.3.In.2, CL.B.3.Su.2)

Mathematics: 6-8

6. Use measurement concepts involving length, weight, and volume to solve problems related to real world situations.

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other:

Linear Measurement

6.1. Identify the most appropriate units of linear measurement to accomplish functional tasks (e.g., measuring your height, calculating the length of a room, determining the distance on a trip). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ inches _____ ❑ feet _____ ❑ yards _____ ❑ miles
_____ ❑ centimeters _____ ❑ meters _____ ❑ other:
_____

6.2. Identify abbreviations for linear measurement units when completing functional tasks (e.g., reading the distance scale on a map, reading measurements for a room layout). (CL.B.1.In.1, CL.B.1.Su.1)
Specify: _____ ❑ linear—in., ft., yd., mi., cm., m. _____ ❑ area—sq. ft., sq. yd., sq. mi.
_____ ❑ other: _____

6.3. Identify the most appropriate tools and equipment for linear measurement to complete functional tasks (e.g., length of tool, unit of measurement, effective and ineffective uses). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ ruler _____ ❑ tape measure _____ ❑ yard stick
_____ ❑ other: _____

6.4. Measure the length, width, or height of object or area accurately using appropriate tools or equipment to accomplish functional tasks (e.g., use a ruler to measure a short line, use a tape measure to measure a room). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ ruler _____ ❑ tape measure _____ ❑ yard stick
_____ ❑ other: _____

6.5. Identify equivalents for commonly used linear measurements to accomplish functional tasks (e.g., determining how many feet on a football field, determining if a 4-foot board will make a 52-inch shelf). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ 12 inches = 1 foot _____ ❑ 3 feet = 1 yard
_____ ❑ 36 inches = 1 yard _____ ❑ other: _____

Mathematics: 6-8

6.6. Solve problems involving linear measurement to accomplish functional tasks (e.g., determining which rope is longer, determining miles to desired destination, determining the height of a fence, determining the length of a soccer field, determining amount of fabric needed to make curtains). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ no conversion _____ ❑ conversion

Volume/Capacity

6.7. Identify the most appropriate units to measure volume or capacity when completing functional tasks (e.g., preparing a recipe, adding oil to the car, purchasing soft drinks). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ cup _____ ❑ pint _____ ❑ quart _____ ❑ gallon
_____ ❑ liter _____ ❑ teaspoon _____ ❑ tablespoon
_____ ❑ other: _____

6.8. Identify abbreviations for volume or capacity measurement units when completing functional tasks (e.g., reading the ingredients required in a recipe). (CL.B.1.In.1, CL.B.1.Su.1)
Specify: _____ ❑ volume—c., tsp., tbs., gal., l. _____ ❑ other: _____

6.9. Identify the most appropriate tools or equipment to measure volume or capacity when completing functional tasks (e.g., dry or liquid ingredients, amount to measure, accuracy). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ measuring cups and spoons _____ ❑ containers marked by volume
_____ ❑ other: _____

6.10. Measure volume or capacity accurately using the appropriate tool or equipment to accomplish functional tasks (e.g., measuring a cup of bleach for the laundry, measuring gas into a tank for a lawnmower, measuring quarts of water for tea, measuring a dose of liquid medicine). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ cup _____ ❑ pint _____ ❑ quart _____ ❑ gallon
_____ ❑ liter _____ ❑ teaspoon _____ ❑ tablespoon
_____ ❑ other: _____

6.11. Identify volume or capacity measurement equivalents to accomplish functional tasks (e.g., determining how many cups of water are needed for two quarts of lemonade, determining how many tablespoons it takes to fill 1/4 cup, determining how many pint jars are needed for a gallon of honey). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ 3 teaspoons = 1 tablespoon _____ ❑ 4 cups = 1 quart
_____ ❑ 4 quarts = 1 gallon _____ ❑ other: _____

6.12. Solve problems involving capacity or volume to accomplish functional tasks (e.g., determining how many glasses can be filled from a one-liter bottle of soda, getting the right size of can for a recipe). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ no conversion _____ ❑ conversion

Mathematics: 6-8

Weight

6.13. Identify the most appropriate units to measure weight to accomplish functional tasks (e.g., weighing an infant, weighing chemicals in science class, buying produce at a store). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ ounce _____ ❑ pound _____ ❑ ton
_____ ❑ gram _____ ❑ kilogram
_____ ❑ other: _____

6.14. Identify abbreviations for weight measurement units when completing functional tasks (e.g., filling out a weight chart, writing a recipe). (CL.B.1.In.1, CL.B.1.Su.1)
Specify: _____ ❑ weight—oz., lb., g., kg. _____ ❑ other: _____

6.15. Identify the most appropriate tools and equipment to measure weight to complete functional tasks (e.g., capacity, accuracy, type of readout). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ bathroom scales _____ ❑ postal scales _____ ❑ produce scales
_____ ❑ other: _____

6.16. Measure weight accurately using the appropriate tool when completing functional tasks (e.g., weighing yourself, weighing the tomatoes at the grocery store, determining how much postage to put on a large envelope). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ bathroom scales _____ ❑ postal scales _____ ❑ produce scales
_____ ❑ other: _____

6.17. Identify equivalents for units of weight when completing functional tasks (e.g., determining cost for mailing a box, determining if truck is strong enough to carry load of gravel). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ 16 ounces = 1 pound _____ ❑ 2000 pounds = 1 ton
_____ ❑ other: _____

6.18. Solve problems involving weight (e.g., determining how many pounds of gravel are needed for a walkway, determining how many ounces of cocoa are needed to make hot chocolate). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ no conversion _____ ❑ conversion

7. Use measurement concepts involving time, temperature, and money to solve problems related to real world situations.

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt

Mathematics: 6-8

___ assistive technology ___ supervision ___ other: _____

_____

Mathematics: 6-8

Time

7.1. Identify the most appropriate units of time to accomplish functional tasks (e.g., making plans for the week, scheduling appointments, predicting the weather). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ seconds, minutes, hours _____ ❑ days, weeks, months, years
_____ ❑ seasons of the year _____ ❑ now, later, future, past
_____ ❑ today, tomorrow _____ ❑ other: _____

7.2. Identify abbreviations for units of time when completing functional tasks (e.g., reading days of the week on a calendar). (CL.B.1.In.1, CL.B.1.Su.1)
Specify: _____ ❑ time—min., hr., wk., mo., yr., Tues., Dec.
_____ ❑ other: _____

7.3. Identify equivalent units of time when accomplishing functional tasks (e.g., determining how many hours to allow for a 90-minute activity). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ 60 seconds = 1 minute _____ ❑ 60 minutes = 1 hour
_____ ❑ 24 hours = 1 day _____ ❑ 7 days = 1 week
_____ ❑ other: _____

7.4. Identify time on a clock to accomplish functional tasks (e.g., timing a runner, setting a VCR to tape a show, estimating time to reach a destination). (CL.B.3.In.1, CL.B.3.Su.1)
Specify type of clock: _____ ❑ analog _____ ❑ digital
Specify interval: _____ ❑ hour/half hour _____ ❑ minutes

7.5. Identify the date on a calendar to accomplish functional tasks (e.g., planning a party, scheduling an appointment). (CL.B.3.In.1, CL.B.3.Su.1)

7.6. Determine the elapsed time between events to accomplish functional tasks (e.g., taking medication every four hours, determining when to schedule next appointment, determining how much time is left to finish the test, determining if warranty is still good). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ conversion _____ ❑ no conversion

7.7. Solve problems involving time to accomplish functional tasks (e.g., setting a VCR to tape a television show, determining how long it has been since last dental checkup). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ conversion _____ ❑ no conversion

Temperature

7.8. Identify the most appropriate units to measure temperature to accomplish functional tasks (e.g., understanding the weather report from a country that uses the metric system, describing a fever, preparing food, reading a temperature gauge in a freezer). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ degrees Fahrenheit _____ ❑ degrees Celsius

Mathematics: 6-8

7.9. Identify the meaning of commonly used temperatures to accomplish functional tasks (e.g., reading a thermometer to record a high fever, determining if the freezer is cold enough to make ice, setting a thermostat in a room). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ freezing and boiling points of water _____ ❑ normal body temperature
_____ ❑ comfortable room temperature _____ ❑ other: _____

7.10. Identify the time and temperature as represented on electronic signs on buildings in the community. (CL.B.1.In.1, CL.B.1.Su.1)

7.11. Identify the most appropriate equipment to measure temperature when completing functional tasks (e.g., purpose, limits, accuracy, type of readout). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ thermometers—weather, oral, cooking
_____ ❑ thermostat—furnace, car, motor
_____ ❑ other: _____

7.12. Measure temperature accurately using the appropriate tool or equipment to accomplish functional tasks (e.g., using a meat thermometer to determine if a roast is fully cooked, reading the thermostat to find the temperature in a room). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ thermometer—weather, oral, cooking
_____ ❑ thermostat—furnace, car, motor
_____ ❑ other: _____

7.13. Solve problems involving temperature to accomplish functional tasks (e.g., checking the oven temperature for cooking). (CL.B.3.In.2, CL.B.3.Su.2)

Money

7.14. Identify the names and values of coins and bills to accomplish functional tasks (e.g., counting money, paying for an item, putting correct change into a vending machine, paying for a cab fare). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ to $1.00_____ ❑ to $5.00_____ ❑ to $20.00
_____ ❑ to $100.00 _____ ❑ other: _____

7.15. Count coins and bills to accomplish functional tasks (e.g., making penny rolls to take to a bank, using quarters to pay for a $2.00 item, paying for the bill at a restaurant). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ to $1.00_____ ❑ to $5.00_____ ❑ to $20.00
_____ ❑ to $100.00 _____ ❑ other: _____

7.16. Identify common coin combinations to accomplish functional tasks (e.g., paying a toll on a highway, paying bus fare, using pay phones, buying a newspaper from a stand, purchasing gum from a machine, placing money in a parking meter). (CL.B.3.In.1, CL.B.3.Su.1)

Mathematics: 6-8

7.17. Determine equivalent amounts of money using coins and paper currency to accomplish functional tasks (e.g., giving change for a dollar, collecting a hundred dollars in small bills). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ to $1.00_____ ❑ to $5.00_____ ❑ to $20.00
_____ ❑ to $100.00 _____ ❑ other: _____

7.18. Use numbers and symbols to represent amounts of money to accomplish functional tasks (e.g., adding amounts of money). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ to $1.00_____ ❑ to $5.00_____ ❑ to $20.00
_____ ❑ to $100.00 _____ ❑ other: _____

7.19. Determine the total cost of items to accomplish functional tasks (e.g., determining how much money is needed to purchase the items). (CL.B.3.In.2, CL.B.3.Su.2)

7.20. Compare the cost of two items to accomplish functional tasks (e.g., determining the least expensive brand in a grocery store, determining how much it would cost to buy the name brand). (CL.B.3.In.2, CL.B.3.Su.2)

7.21. Calculate correct change to accomplish functional tasks (e.g., making sales of items, verifying change given from a vending machine, counting change as a customer). (CL.B.3.In.2, CL.B.3.Su.2)
Specify: _____ ❑ to $1.00_____ ❑ to $5.00_____ ❑ to $10.00
_____ ❑ to $20.00 _____ ❑ to $100.00 _____ ❑ other: _____

7.22. Solve problems involving purchases with a discount to accomplish functional tasks (e.g. determining cost if shirt is 30% off, determining cost of an item with a rebate). (CL.B.3.In.2, CL.B.3.Su.2)

7.23. Solve problems involving rate of interest and sales tax to accomplish functional tasks (e.g., interest on a car loan, sales tax). (CL.B.3.In.2, CL.B.3.Su.2)

7.24. Identify purposes and functions of banks and credit unions (e.g., financial transactions, maintaining a savings account, establishing credit for future loans). (IF.A.2.In.1, IF.A.2.Su.1)

8. Demonstrate functional knowledge of basic concepts of geometry and spatial relationships related to activities of daily living (e.g., use of two- and three-dimensional shapes, changes in shapes and forms, relationship among objects in space).

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt

Mathematics: 6-8

___ assistive technology ___ supervision ___ other: _____

8.1. Identify two-dimensional shapes to accomplish functional tasks (e.g., drawing a circle, identifying a yield sign, buying a mat for a picture frame, finding a tablecloth for a table). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ square _____ ❑ rectangle _____ ❑ triangle _____ ❑ circle

8.2. Identify three-dimensional shapes to accomplish functional tasks (e.g., selecting a tube for packaging a poster for shipping, making a cone for frosting a cake). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ cube _____ ❑ sphere _____ ❑ cylinder _____ ❑ cone

8.3. Use points, lines, and line segments to accomplish functional tasks (e.g., making a scale drawing of a room, identifying the distance between two points on a map). (CL.B.3.In.2, CL.B.3.Su.2)

8.4. Use angles to accomplish functional tasks (e.g., rearranging furniture, laying tiles on a diagonal, hanging a bulletin board, folding a napkin in a triangle, identifying angle of release when shooting a basketball). (CL.B.3.In.2, CL.B.3.Su.2)

8.5. Use parallel or perpendicular lines to accomplish functional tasks (e.g., aligning two pictures on a wall, drawing parallel lines on a paper to write a letter, drawing a map that shows the intersection of two streets). (CL.B.3.In.2, CL.B.3.Su.2)

8.6. Identify functional situations when it is useful to locate coordinate points on a grid (e.g., reading a map, determining direction of coordinates when traveling on a boat). (CL.B.3.In.1, CL.B.3.Su.1)

8.7. Solve problems involving the perimeter or area of a rectangle or square to accomplish functional tasks (e.g., calculating the distance around a mall or a block for exercising, determining the area of a room to purchase carpet). (CL.B.3.In.2, CL.B.3.Su.2)

9. Apply functional algebraic problem-solving strategies in real world situations (e.g., classification schemes, formulas, patterns, graphs).

CL.B.3.In.2	apply mathematical concepts and processes to solve problems.
CL.B.3.Su.2	apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.
CL.B.4.In.1	identify problems and examine alternative solutions.
CL.B.4.In.2	implement solutions to problems and evaluate effectiveness.
CL.B.4.Su.1	identify problems found in functional tasks—with guidance and support.
CL.B.4.Su.2	implement solutions to problems found in functional tasks—with guidance and support.

Mathematics: 6-8

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other:
_____

Algebraic Thinking

9.1. Identify patterns and relationships among numbers when accomplishing functional tasks (e.g., finding the odd numbers, estimating the height of a flight of stairs). (CL.B.3.In.1, CL.B.3.Su.1)

9.2. Apply a pattern or relationship to explain how a change in one quantity results in a change in another when accomplishing functional tasks (e.g., doubling a recipe doubles all ingredients). (CL.B.3.In.2, CL.B.3.Su.2)

9.3. Identify the variables and operations expressed in an equation by a formula to accomplish functional tasks (e.g., determining tip for a restaurant bill—total bill x 15%; centering a picture—length/2; calculating unit costs—price is 3 lbs./$1). (CL.B.3.In.1, CL.B.3.Su.1)

9.4. Use a formula or equation to solve a problem involving mathematical concepts (e.g., to determine the area of a room—l x w; to determine the overdue book fine—days x fine each day; to determine amount of time it will take to travel to a different city—distance divided by rate = time). (CL.B.3.In.2, CL.B.3.Su.2)

9.5. Find the value of an unknown variable in a formula or equation to accomplish functional tasks (e.g., calculating the rate of travel—given the distance and time— r = d/t; calculating salary—given hourly wage and hours worked—wage x hours = salary). (CL.B.3.In.2, CL.B.3.Su.2)

9.6. Substitute variables in a formula or equation to accomplish functional tasks (e.g., comparing Centigrade to Fahrenheit temperature readings, doubling a recipe, converting square feet to square yards when measuring carpet for a room). (CL.B.3.In.2, CL.B.3.Su.2)

Solving Mathematical Problems

9.7. Follow a systematic approach when using mathematical concepts and processes to solve problems in accomplishing functional tasks. (CL.B.4.In.1, CL.B.4.In.2, CL.B.4.Su.1, CL.B.4.Su.2)

Specify: _____ ❑ determine nature of the problem
_____ ❑ select correct technique
_____ ❑ make reasonable estimate of results
_____ ❑ apply operation or procedures to obtain result
_____ ❑ check results for accuracy
_____ ❑ explain results

_____ ❑ other: _____

9.8. Determine whether insufficient or extraneous information is given in solving particular mathematical problems (e.g., "Do I have all the information I need?" "What does this information have to do with the problem?"). (CL.B.4.In.1, CL.B.4.Su.1)

9.9. Express mathematical problems using alternative methods to accomplish functional tasks. (CL.B.4.In.2, CL.B.4.Su.2)

Specify: _____ ❑ drawing pictures or diagrams _____ ❑ using concrete objects
_____ ❑ paraphrasing _____ ❑ using models
_____ ❑ other: _____

10. Demonstrate awareness of concepts of probability and chance in activities of daily living (e.g., predict likelihood, use drawings to display possible outcomes, identify patterns in objects or events).

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other:
_____

10.1. Identify the meaning of basic concepts of chance and probability (e.g., How likely? What are the odds? What do you predict will happen? Can you count on it? What is the possibility? How do you know?). (CL.B.3.In.1, CL.B.3.Su.1)

10.2. Identify situations in daily life when the concepts of chance and probability are used (e.g., in weather forecasts—a 30% chance of rain; in winning the lottery—a million-to-one chance to win; in a playoff series for a championship). (CL.B.3.In.1, CL.B.3.Su.1)

10.3. Make a reasonable prediction of the likelihood of a simple event occurring (e.g., chance of meeting the President, likelihood of your football team winning the next game). (CL.B.3.In.2, CL.B.3.Su.2)

10.4. Determine the odds for and the odds against a given situation (e.g., raining on a particular day, winning the lottery). (CL.B.3.In.2, CL.B.3.Su.2)

11. Interpret graphs, tables, and other types of data displays to solve problems related to daily living.

Mathematics: 6-8

CL.B.3.In.2 apply mathematical concepts and processes to solve problems.

CL.B.3.Su.2 apply mathematical concepts and processes needed to accomplish functional tasks—with guidance and support.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other:
_____

11.1. Identify functional situations when it is useful to gather and organize data (e.g., calculating a bowling average, keeping track of monthly expenditures, charting the growth of a child, preparing to file a tax return). (CL.B.3.In.1, CL.B.3.Su.1)

11.2. Identify the meaning of measures of central tendency to accomplish functional tasks. (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ mean (average)—estimating the average cost of school supplies
_____ ❑ mode (most frequent)—determining when a restaurant has the most customers

11.3. Solve problems using measures of central tendency to accomplish functional tasks (e.g., determining the most frequent exam scores, determining the average number of customers for a paper route). (CL.B.3.In.2, CL.B.3.Su.2)

11.4. Identify the meaning of information that is displayed graphically in various forms (e.g., locate the team with the highest scores, locate high temperatures in a weather report). (CL.B.3.In.1, CL.B.3.Su.1)
Specify: _____ ❑ charts _____ ❑ graphs _____ ❑ tables
_____ ❑ other: _____

11.5. Solve problems using information displayed in charts and tables to accomplish functional tasks (e.g., determining the highest temperature for the week from a bar graph, determining from a pie graph what percentage of time the student spends sleeping, determining the class's favorite ice cream flavor from a graph). (CL.B.3.In.2, CL.B.3.Su.2)

12. Use calculators and other electronic tools to assist with computation.

Indicate guidance and support necessary for mastery at supported level:
___ physical prompt ___ verbal prompt ___ visual prompt
___ assistive technology ___ supervision ___ other:
_____

12.1. Identify the most appropriate electronic tool to use in solving selected mathematical problems (e.g., calculator, adding machine, automatic cash register). (CL.C.2.In.2, CL.C.2.Su.2)

Mathematics: 6-8

12.2. Identify situations when it is appropriate to use electronic tools to assist with calculations (e.g., balancing checkbook, working as a cashier, making out a budget). (CL.C.2.In.2, CL.C.2.Su.2)

12.3. Demonstrate skills needed to use a calculator correctly. (CL.C.2.In.2, CL.C.2.Su.2)

Specify: _____ ❑ turning on and off
_____ ❑ entering a number
_____ ❑ entering a function—add, subtract, multiply, divide
_____ ❑ getting a total
_____ ❑ using percent
_____ ❑ clearing the display
_____ ❑ correcting a mistake
_____ ❑ other: _____

12.4. Use a calculator to assist with computation to accomplish functional tasks (e.g., balancing a checkbook, determining purchase price of a 30% off sale, determining the average of five grades, determining the tax on a hotel room). (CL.C.2.In.2, CL.C.2.Su.2)

Florida

COURSE DESCRIPTION – M/J Mathematics 1

Subject Area: Mathematics

Course Number: 1205010

Course Title: M/J Mathematics 1

Basic Assumptions for Mathematics Education:

- All students have access to calculators and computers.
- Classroom activities are student-centered, emphasizing concrete experiences and active/experiential learning.
- All courses have increased emphasis on problem solving, estimation, and real-world applications.
- Evaluation includes alternative methods of assessment.
- All strands addressed in the Sunshine State Standards are developed across the PreK-12 curriculum.

A. Major Concepts/Content. The purpose of this course is to continue the development of mathematical concepts and processes that can be used to solve real-world and mathematical problems.

The content will include, but not be limited to, the following:

- structure and properties of rational numbers, including whole numbers, integers, fractions, mixed numbers, and decimals
- equivalent representations of numbers, including fractions, decimals, and percents, numbers with exponents, and absolute value
- operations and problem solving with rational numbers
- number theory, including primes, factors, multiples, and number sequences
- measurement techniques including choice of appropriate instruments, conversion of units, scale drawings, and derivation of simple geometric formulas for perimeter and area
- geometric terminology, properties, and relationships
- transformational geometry, including flips, turns, and slides

M/J Mathematics 1

- algebraic thinking: analyzing and expressing patterns and relationships in various ways, including words, manipulatives, tables, graphs, number sequences, algebraic expressions, and geometric formulas
- statistical methods for collecting, organizing, analyzing, and displaying data, including measures of central tendency
- introduction to probability, including comparison of experimental and mathematically expected results
- basic calculator skills

This course shall integrate the Goal 3 Student Performance Standards of the Florida System of School Improvement and Accountability as appropriate to the content and processes of the subject matter.

B. Special Note. None

C. Course Requirements. These requirements include the benchmarks from the Sunshine State Standards that are most relevant to this course. The benchmarks printed in regular type are required for this course. **The portions printed in *italic type* are <u>not</u> required for this course.**

After successfully completing this course, the student will:

1. Demonstrate understanding and application of concepts about number systems.

MA.A.2.3.1 understand and use exponential *and scientific notation.*

MA.A.2.3.2 understand the structure of number systems other than the decimal number system.

MA.A.5.3.1 use concepts about numbers, including primes, factors, and multiples, to build number sequences.

2. Demonstrate understanding and apply a variety of strategies to solve problems.

MA.A.3.3.1 understand and explain the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, *including the inverse relationships of positive and negative numbers.*

MA.A.3.3.2 select the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, *ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.*

(**Note:** Problems may be limited to integers or non-negative rational numbers.)

MA.A.3.3.3 add, subtract, multiply, and divide whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

MA.A.4.3.1 use estimation strategies to predict results and to check the reasonableness of results.

MA.B.2.3.1 use direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.

MA.B.2.3.2 solve problems involving units of measure and convert answers to a larger or smaller unit within either the metric or customary system.

MA.D.2.3.1 represent and solve real-world problems graphically, with algebraic expressions, *equations, and inequalities*.

MA.D.2.3.2 use algebraic problem-solving strategies to solve real-world problems *involving linear equations and inequalities.*

3. Estimate and measure quantities and use measures to solve problems.

MA.A.4.3.1 use estimation strategies to predict results and to check the reasonableness of results.

MA.B.1.3.1 use concrete and graphic models to derive formulas for finding perimeter, area, *surface area,* circumference *and volume* of two- *and three*-dimensional shapes, *including rectangular solids and cylinders.*

MA.B.1.3.2 use concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.

MA.B.1.3.3 understand and describe how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, *surface area, and volume.*

M/J Mathematics 1

MA.B.1.3.4 construct, interpret, and use scale drawings such as those based on number lines and maps to solve real-world problems.

MA.B.3.3.1 solve real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume in either customary or metric units.

MA.B.4.3.1 select appropriate units of measurement *and determine and apply significant digits in a real world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement.)*MA.B.4.3.2 select and use appropriate instruments, *technology, and techniques* to measure quantities *in order to achieve specified degrees of accuracy in a problem situation.*

4. Describe situations either verbally or by using graphical, numerical, physical or algebraic mathematical models.

MA.A.1.3.1 associate verbal names, written word names, and standard numerals with integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; *numbers in scientific notation; radicals*; absolute value; and ratios.

MA.A.1.3.2 understand the relative size of integers, fractions, decimals, numbers expressed as percents, numbers with exponents, *numbers in scientific notation, radicals,* absolute value, and ratios.

MA.A.1.3.3 understand concrete and symbolic representations of rational numbers *and irrational numbers* in real-world situations.

MA.D.1.3.1 describe a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, *equations, and inequalities.*

MA.D.1.3.2 create and interpret tables, graphs, *equations,* and verbal descriptions to explain cause-and-effect relationships.

5. Demonstrate understanding, representation, and use of numbers in a variety of equivalent forms.

MA.A.1.3.4 understand that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, *scientific notation,* exponents, *radicals,* and absolute value.

MJ Mathematics 1

6. Apply statistical methods and probability concepts in real-world situations.

MA.A.4.3.1 use estimation strategies to predict results and to check the reasonableness of results.

MA.E.1.3.1 collect, organize, and display data in a variety of forms, including tables, line graphs, charts, and bar graphs, to determine how different ways of presenting data can lead to different interpretations.

MA.E.1.3.2 understand and apply the concepts of range and central tendency (mean, median, and mode).

MA.E.1.3.3 analyze real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.

MA.E.2.3.1 compare experimental results with mathematical expectation of probabilities.

(**Note:** The following types of problems may be used for this course: a) calculate simple probabilities and use multiple representations; b) obtain experimental results using manipulatives; c) collect data and construct graphs.)

7. Use geometric properties and relationships.

MA.C.1.3.1 understand the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions.

MA.C.2.3.1 understand the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.

MA.C.3.3.1 represent and apply geometric properties and relationships to solve real-world and mathematical problems.

MA.C.3.3.2 identify and plot ordered pairs in all four quadrants of a rectangular coordinate system (graph) *and apply simple properties of lines.*

Florida

COURSE DESCRIPTION – M/J Mathematics 2

Subject Area: Mathematics
Course Number: 1205040
Course Title: M/J Mathematics 2

Basic Assumptions for Mathematics Education:

- All students have access to calculators and computers.
- Classroom activities are student-centered, emphasizing concrete experiences and active/experiential learning.
- All courses have increased emphasis on problem solving, estimation, and real-world applications.
- Evaluation includes alternative methods of assessment.
- All strands addressed in the Sunshine State Standards are developed across the PreK-12 curriculum.

A. **Major Concepts/Content.** The purpose of this course is to continue the development of mathematical concepts and processes that can be used to solve real-world and mathematical problems.

The content will include, but not be limited to, the following:

- structure and properties of rational numbers, including whole numbers, integers, fractions, mixed numbers, and decimals
- equivalent representations of numbers, including fractions, decimals, and percents, numbers with exponents, scientific notation, and absolute value
- operations and problem solving with rational numbers
- number theory, including primes, factors, multiples, and number sequences
- measurement techniques including choice of appropriate instruments, conversion of units, scale drawings, and derivation of simple geometric formulas for perimeter, area, and volume
- geometric terminology, properties, and relationships
- transformational geometry, including flips, turns, and slides

- algebraic thinking: analyzing and expressing patterns and relationships in various ways, including words, manipulatives, tables, graphs, number sequences, algebraic expressions and equations, and geometric formulas
- statistical methods for collecting, organizing, analyzing, and displaying data
- introduction to probability, including comparison of experimental and mathematically expected results
- basic calculator skills

This course shall integrate the Goal 3 Student Performance Standards of the Florida System of School Improvement and Accountability as appropriate to the content and processes of the subject matter.

B. Special Note. None

C. Course Requirements. These requirements include the benchmarks from the Sunshine State Standards that are most relevant to this course. The benchmarks printed in regular type are required for this course. **The portions printed in *italic type* are <u>not</u> required for this course.**

After successfully completing this course, the student will:

1. Demonstrate understanding and application of concepts about number systems.

MA.A.2.3.1 understand and use exponential and scientific notation.

MA.A.2.3.2 understand the structure of number systems other than the decimal system.

MA.A.5.3.1 use concepts about numbers, including primes, factors, and multiples, to build number sequences.

2. Demonstrate understanding and application of a variety of strategies to solve problems.

MA.A.3.3.1 understand and explain the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers and decimals, including the inverse relationship of positive and negative numbers.

MA.A.3.3.2	select the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.
MA.A.3.3.3	add, subtract, multiply, and divide whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.
MA.A.4.3.1	use estimation strategies to predict results and to check the reasonableness of results.
MA.B.2.3.1	use direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.
MA.B.2.3.2	solve problems involving units of measure and convert answers to a larger or smaller unit within either the metric or customary system.
MA.D.2.3.1	represent and solve real-world problems graphically, with algebraic expressions, equations, *and inequalities*.
MA.D.2.3.2	use algebraic problem-solving strategies to solve real-world problems involving linear equations *and inequalities*.

3. Estimate and measure quantities and use measures to solve problems.

MA.A.4.3.1	use estimation strategies to predict results and to check the reasonableness of results.
MA.B.1.3.1	use concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two-and three dimensional shapes, including rectangular solids and cylinders.
MA.B.1.3.2	use concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.
MA.B.1.3.3	understand and describe how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume.

MJ Mathematics 2

MA.B.1.3.4 construct, interpret, and use scale drawings such as those based on number lines and maps to solve real-world problems.

MA.B.3.3.1 solve real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume in either customary or metric units.

MA.B.4.3.1 select appropriate units of measurement and determine and apply significant digits in a real-world context. (Significant digits should relate to *both instrument precision and to* the least precise unit of measurement.)

MA.B.4.3.2 select and use appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.

4. Describe situations either verbally or by using graphical, numerical, physical, or algebraic mathematical models.

MA.A.1.3.1 associate verbal names, written word names, and standard numerals with integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; *radicals;* absolute value; and ratios.

MA.A.1.3.2 understand the relative size of integers, fractions, and decimals; numbers expressed as percents, numbers with exponents, numbers in scientific notation; *radicals;* absolute value; and ratios.

MA.A.1.3.3 understand concrete and symbolic representations of rational numbers *and irrational numbers* in real-world situations.

MA.D.1.3.1 describe a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, equations *and inequalities.*

MA.D.1.3.2 create and interpret tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.

MA.E.1.3.1 collect, organize, and display data in a variety of forms, including tables, line graphs, charts, and bar graphs, to determine how different ways of presenting data can lead to different interpretations.

5.

Demonstrate understanding, representation, and use of numbers in a variety of equivalent forms.

MA.A.1.3.4 understand that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, *radicals,* and absolute value.

6. Apply statistical methods and probability concepts in real world situations.

MA.A.4.3.1 use estimation strategies to predict results and to check the reasonableness of results.

MA.E.1.3.2 understand and apply the concepts of range and central tendency (mean, median, and mode).

MA.E.1.3.3 analyze real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.

MA.E.2.3.1 compare experimental results with mathematical expectations of probabilities.

(**Note**: Problems may include the use of manipulatives to obtain experimental results for simple and compound probabilities, comparison to mathematical expectations and a discussion of the validity of the experiments.)

MA.E.2.3.2 determine the odds for and the odds against a given situation.

7. Use geometric properties and relationships.

MA.C.1.3.1 understand the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions.

MA.C.2.3.1 understand the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.

MA.C.3.3.1 represent and apply geometric properties and relationships to solve real-world and mathematical problems.

MA.C.3.3.2 identify and plot ordered pairs in all four quadrants of a rectangular coordinate system (graph) *and apply simple properties of lines.*

Florida

COURSE DESCRIPTION – MJ Mathematics 3

Subject Area: Mathematics

Course Number: 1205070

Course Title: M/J Mathematics 3

Basic Assumptions for Mathematics Education:

- All students have access to calculators and computers.
- Classroom activities are student-centered, emphasizing concrete experiences and active/experiential learning.
- All courses have increased emphasis on problem solving, estimation, and real-world applications.
- Evaluation includes alternative methods of assessment.
- All strands addressed in the Sunshine State Standards are developed across the PreK-12 curriculum.

A. Major Concepts/Content. The purpose of this course is to continue the development of mathematical concepts and processes that can be used to solve real-world and mathematical problems.

The content will include, but not be limited to, the following:

- structure and properties of rational and irrational numbers
- equivalent representations of numbers, including fractions, decimals, and percents, numbers with exponents and radicals, scientific notation, and absolute value
- operations and problem solving with rational and irrational numbers
- number theory, including primes, factors, multiples, and number sequences
- measurement techniques including choice of appropriate instruments, conversion of units, scale drawings, and derivation of geometric formulas for perimeter, area, and volume
- geometric terminology, properties, and relationships
- transformational geometry, including flips, turns, and slides

- algebraic thinking: analyzing and expressing patterns and relationships in various ways, including words, manipulatives, tables, graphs, number sequences, algebraic expressions and equations, algebraic inequalities, and geometric formulas
- ratio, proportion, and percent
- statistical methods for collecting, organizing, analyzing, and displaying data
- introduction to probability, including comparison of experimental and mathematically expected results
- basic calculator skills

This course shall integrate the Goal 3 Student Performance Standards of the Florida system of School Improvement and Accountability as appropriate to the content and processes of the subject matter.

B. Special Note. None

C. Course Requirements. These requirements include the benchmarks from the Sunshine State Standards that are most relevant to this course. The benchmarks printed in regular type are required for this course. **The portions printed in *italic type* are <u>not</u> required for this course.**

After successfully completing this course, the student will:

1. Demonstrate understanding and application of concepts about number systems.

MA.A.2.3.1 understand and use exponential and scientific notation.

MA.A.2.3.2 understand the structure of number systems other than the decimal system.

MA.A.5.3.1 use concepts about numbers, including primes, factors, and multiples, to build number sequences.

2. Demonstrate understanding and application of a variety of strategies to solve problems.

MA.A.3.3.1 understand and explain the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers and decimals, including the inverse relationship of positive and negative numbers.

MA.A.3.3.2	select the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.
MA.A.3.3.3	add, subtract, multiply, and divide whole numbers, decimals, and fractions including mixed numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.
MA.A.4.3.1	use estimation strategies to predict results and to check the reasonableness of results.
MA.B.2.3.1	use direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.
MA.B.2.3.2	solve problems involving units of measure and convert answers to a larger or smaller unit within either the metric or customary system.
MA.D.2.3.1	represent and solve real-world problems graphically, with algebraic expressions, equations, and inequalities.
MA.D.2.3.2	use algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.

3. Estimate and measure quantities and use measures to solve problems.

MA.A.4.3.1	use estimation strategies to predict results and to check the reasonableness of results.
MA.B.1.3.1	use concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two-and three- dimensional shapes, including rectangular solids and cylinders.
MA.B.1.3.2	use concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.
MA.B.1.3.3	understand and describe how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume.

MJ Mathematics 3

MA.B.1.3.4 construct, interpret, and use scale drawings such as those based on number lines and maps to solve real-world problems.

MA.B.3.3.1 solve real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume in either customary or metric units.

MA.B.4.3.1 select appropriate units of measurement and determine and apply significant digits in a real-world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement.)

MA.B.4.3.2 select and use appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.

4. Describe situations either verbally or by using graphical, numerical, physical, or algebraic mathematical models.

MA.A.1.3.1 associate verbal names, written word names, and standard numerals with integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

MA.A.1.3.2 understand the relative size of integers, fractions, and decimals, numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

MA.A.1.3.3 understand concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.

MA.E.1.3.1 collect, organize, and display data in a variety of forms, including tables, line graphs, charts, and bar graphs, to determine how different ways of presenting data can lead to different interpretations.

MJ Mathematics 3

5. Demonstrate understanding, representation, and use of numbers in a variety of equivalent forms.

MA.A.1.3.4 understand that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value.

6. Apply statistical methods and probability concepts in real-world situations.

MA.A.4.3.1 use estimation strategies to predict results and to check the reasonableness of results.

MA.E.1.3.2 understand and apply the concepts of range and central tendency (mean, median, and mode).

MA.E.1.3.3 analyze real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.

MA.E.2.3.1 compare experimental results with mathematical expectations of probabilities.

MA.E.2.3.2 determine the odds for and the odds against a given situation.

MA.E.3.3.1 formulate hypotheses, design experiments, collect and interpret data, and evaluate hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts.

MA.E.3.3.2 identify the common uses and misuses of probability and statistical analysis in the everyday world.

7. Use the relationships among arithmetic, algebra, and geometry.

MA.C.1.3.1 understand the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions.

MA.C.2.3.1 understand the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.

MJ Mathematics 3

MA.C.2.3.2	predict and verify patterns involving tessellations (covering of a plane with congruent copies of the same pattern with no holes or overlaps, like floor tiles).
MA.C.3.3.1	represent and apply geometric properties and relationships to solve real-world and mathematical problems.
MA.C.3.3.2	identify and plot ordered pairs in all four quadrants of a rectangular coordinate system (graph) and apply simple properties of lines.
MA.D.1.3.1	describe a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, equations, and inequalities.
MA.D.1.3.2	create and interpret tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.

Florida

COURSE DESCRIPTION – MJ Intensive Mathematics

Subject Area: Mathematics

Course Number: 1204000

Course Title: M/J Intensive Mathematics

Basic Assumptions for Mathematics Education:

- All students have access to calculators and computers.
- Classroom activities are student-centered, emphasizing concrete experiences and active/experiential learning.
- All courses have increased emphasis on problem solving, estimation, and real-world applications.
- Evaluation includes alternative methods of assessment.
- All strands addressed in the Sunshine State Standards are developed across the PreK-12 curriculum.

A. **Major Concepts/Content.** The purpose of this course is to provide remedial instruction and practice in mathematics skills and concepts.

The content should include, but not be limited to, the following:

- mathematics content identified by diagnosis of each student's needs for remedial instruction specified in the academic improvement plan
- test-taking skills and strategies for mathematics

This course shall integrate Goal 3 Student Performance Standards of the Florida System of School Improvement and Accountability as appropriate for the content and processes of the subject matter.

Course student performance standards must be adopted by the district, and they must reflect appropriate Sunshine State Standards benchmarks.

B. **Special Note.** This course may be repeated by a student if, on subsequent offerings, the required level of student proficiency increases.

The instructional strategies used in this course should be designed to provide effective remedial strategies to meet the needs of each student.

Students should be given opportunities for guided, shared, and independent mathematics test-taking practice.

C. Course Requirements. No Sunshine State Standards benchmarks are specified in the course requirements for this course description. The course requirements may be aligned with benchmarks for grades 3-5 or 6-8, or a mixture of the two, as appropriate to the needs of the students. It is the responsibility of the district to assure that identified benchmarks are consistent with the needs of the students.

After successfully completing this course, the student will:

1. **Achieve appropriate Sunshine State Standards benchmarks for mathematics identified through individual diagnosis of each student's needs for remedial instruction specified in the academic improvement plan.**

2. **Apply test-taking skills and strategies for mathematics in a variety of contexts.**

Requirements for Braille Textbook Production

INSTRUCTIONS FOR PREPARING COMPUTER DISKETTES REQUIRED FOR AUTOMATED BRAILLE TEXTBOOK PRODUCTION

STATUTORY AUTHORIZATION

Section 233.0561(5), Florida Statutes, states that, "...any publisher of a textbook adopted pursuant to the state instructional materials adoption process shall furnish the Department of Education with a computer file in an electronic format specified by the Department at least 2 years in advance that is readily translatable to Braille and can be used for large print or speech access. Any textbook reproduced pursuant to the provisions of this subsection shall be purchased at a price equal to the price paid for the textbook as adopted. The Department of Education shall not reproduce textbooks obtained pursuant to this subsection in any manner that would generate revenues for the department from the use of such computer files or that would preclude the rightful payment of fees to the publisher for use of all or some portion of the textbook."

OBJECTIVE

Electronic text (etext) is needed to accelerate the production of textbooks in Braille and other accessible formats through the use of translation software. Some embedded publisher formatting commands help speed the conversion of English text to Braille or other accessible formats. Therefore, the objective of these instructions is to prompt publishers to provide textbook data in a format that will be useful to Braille and other accessible format producers while at the same time allowing each publisher the flexibility of using existing composition or typesetting systems. Publishers may produce etext files in one of three formats, as shown in the specifications below.

By April 1, 1998, publishers of adopted student textbooks for literary subjects must be able to provide the computer diskettes **UPON REQUEST**. Publishers shall provide nonliterary subjects when technology becomes available for the conversion of nonliterary materials to the appropriate format.

The requested computer diskettes shall be provided to the Florida Instructional Materials Center for the Visually Impaired (FIMC), 5002 North Lois Avenue, Tampa, Florida 33614; (813) 872-5281; in Florida WATS (800) 282-9193 or (813) 872-5284 (FAX). The center will contact each publisher of an adopted textbook and provide delivery instructions.

SPECIFICATIONS

FORMAT (Three Options):	a. A full implementation of Standard Generalized Markup Language (SGML). b. XML-Extensible Markup Language c. ASCII – (Last Resort!)
2. OPERATING SYSTEM:	Windows
3. DISKETTE SIZE:	3.5, CD, Zip100
4. DISKETTE CAPACITY:	Double-sided/high density
5. DISKETTE LABELING:	a. Sequential Number/ISBN b. Book Title c. File Name d. Name of Publisher e. Name of Typesetting Company/Contact Name f. Format Option and Version g. Copyright Date h. Wording such as: "All rights reserved. As described in Chapter 233.0561(5), Florida Statutes, no use may be made of these diskettes other than the creating of a Braille, Large Print, or Recorded version of the materials contained on this diskette for students with visual impairments in the State of Florida."
6. REQUIRED CONTENTS:	a. Title Page b. List of Consultants and Reviewers (if appropriate) c. Table of Contents d. All Textbook Chapters e. All Appendices f. All Glossaries g. Indices
7. FILE STRUCTURE:	Each chapter of a textbook will be formatted as a separate file.
8. FILE LIST:	A separate file listing the structure of the primary files must be provided. This file should be labeled DISKLIST TEXT. In addition, all special instructions (e.g., merging of materials kept in a separate file) should be noted in this file.
9. LOCATION OF SPECIAL DATA	Marginal notes, footnotes, captions, and other special items must be placed consistently within each text file.
10. CORRECTIONS AND CHANGES	A conscientious effort should be made to update files to exactly duplicate the adopted printed version of the textbook (including corrections and changes). If this cannot be accomplished in a timely and cost effective manner, the publisher will coordinate with the FIMC Supervisor and provide to the Supervisor one set of marked tearsheets of all corrections and changes not included in the files.