

MATH STANDARDS LEVEL 2

1.0 Number Sense and Operations – Students understand ways of representing numbers, relationships among numbers, and number systems. They understand the meaning of and relationships between operations and strategies, and they can estimate appropriately.

Focus Goals

- 1.1 Understand the relationship among numbers, quantities and place value in whole numbers up to 1000 (c/s/em)
- 1.2 Estimate, calculate and solve problems involving addition and subtraction of two and three digit numbers (c) with and without regrouping, and without calculators (c/p/s/em)
- 1.3 Model and solve simple problems involving multiplication and division (c/em)
- 1.4 Understand that fractions and decimals can refer to parts of a set and parts of a whole (c/s/em)
- 1.5 Model and solve problems by representing, adding and subtracting amounts of money (c/em)
- 1.6 Use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, hundreds and thousands places (c)

2.0 Patterns, Functions and Algebra – Students know and understand various types of patterns and functional relationships. They use symbolic forms and models to represent and analyze mathematical structures in both real and abstract contexts.

Focus Goals

- 2.1 Model, represent and interpret number relationships to create and solve problems involving addition and subtraction (c)
- 2.2 Use patterns when solving problems or analyzing data (c/p/em)

3.0 Measurement – Students know and understand attributes, units and systems of measurement. They apply a variety of techniques, tools and formulas for determining measurements.

Focus Goals

- 3.1 Understand that measurement requires identifying a unit of measure, repeating that unit and comparing it to the item to be measured (c/em)
- 3.2 Apply concepts about time (c/p/s/em)

4.0 Geometry and Spatial Sense – Students know how to analyze characteristics and properties of two- and three-dimensional objects. They select and use different representational systems, including coordinate and graph theory. They understand the usefulness of transformations and symmetry in analyzing mathematical situations. They know how to visualize and to use spatial reasoning to solve problems that cross disciplines.

Focus Goals

- 4.1 Identify and describe the elements that define common figures in the plane, and of common objects in space (c), and relate them to similar objects in the environment (p/em)
- 4.2 Use spatial organization (p)

5.0 Data Analysis, Statistics, and Probability – Students know how to pose questions and collect, organize, represent and interpret data in order to answer those questions. They use methods of exploratory data analysis to develop and evaluate inferences, predictions, and arguments that are based on data. They understand and know how to apply the notions of chance and probability.

Focus Goals

- 5.1 Collect, record, organize, display and interpret numerical data on bar graphs, and other representations (c/p/em)

6.0 Problem Solving - Students know that they learn basic math skills and concepts in order to use them to solve problems in and out of school. They solve routine and complex problems by drawing from a variety of strategies, including technology, and demonstrate an attitude of persistence and reflection in their approaches.

Focus Goals

- 6.1 Make decisions about how to set up a problem (c)
- 6.2 Apply a variety of strategies to solve problems (s/em)

7.0 Math Processes: Reasoning, Communication, and Connections – Students use reasoning to develop, analyze, draw conclusions, and validate conjectures and arguments. As they reason, they recognize and understand multiple representations of the same concept. They see the interconnections among math ideas, as well as in other disciplines. They know how to communicate their math thinking clearly and coherently to others, orally, graphically, and in writing, using precise language and symbols.

Focus Goals

- 7.1 Solve problems and justify reasoning
- 7.2 Communicate math thinking orally, graphically, and in writing (p)
- 7.3 Understand multiple representations of the same concept (p)
- 7.4 Note connections between one problem and another (c)

**MATH STANDARDS
LEVEL 2**

1.0 Number Sense and Operations - Students understand ways of representing numbers, relationships among numbers, and number systems. They understand the meaning of and relationships between operations and strategies fluently, and they can estimate appropriately.

1.1 Understand the relationship among numbers, quantities and place value in whole numbers up to 1000

(c/s/em)

- θ Count, read, and write numbers to 1000 and identify the place value for each digit (c) (p=100)
- θ Use words, models and expanded forms to represent numbers to 1000 (c/s)
- θ Order, sequence and compare whole numbers up to 1000 using the symbols less than (<), equal to (=), greater than (>) (c/em/s)
- θ Recognize and write three digit numerals in random order (p)
- θ Use ordinal numbers (p/em) and identify ordinal positions (s)
- θ Understand that skip counting is counting by groups of objects. Skip count forward and backward by 2's, 3's, 5's (s), 10's, and 100's (p/em)
- θ Groups numbers in odd or even categories (s)

1.2 Estimate, calculate and solve problems involving addition and subtraction of two and three digit numbers (c) with and without regrouping, and without calculators (c/p/s/em)

- θ Understand and use the inverse relationship between addition and subtraction (e.g., an opposite number sentence for $8+6=14$ is $14-6=8$) to solve problems and check solutions (c/em)
- θ Understand fact families ($5+7=12$ and $7+5=12$ so $12-5=7$ and $12-7=5$) (p/em)
- θ Begin to add three two-digit numbers (p)
- θ Find the sum or difference of two whole numbers up to three digits long (c/em)
- θ Use mental arithmetic to find the sum or difference of two 2-digit numbers (c/em)
- θ Add vertically and horizontally (s)

1.3 Model and solve simple problems involving multiplication and division (c/em)

- θ Use repeated addition, arrays and counting by multiples to do multiplication (c/s/em)
- θ Use repeated subtraction, equal sharing and forming equal groups to do division with remainders (c)
- θ Begin to learn facts 0 to 5 (p), and know the multiplication tables of 2's, 5's and 10's (to times 10) and commit to memory (c)

1.4 Understand that fractions and decimals can refer to parts of a set and parts of a whole (c/s/em)

- θ Identify simple fractions, concretely and symbolically (p/em)
- θ Recognize, name and compare unit fractions up to $1/12$ (c), $1/3$ (s)
- θ Recognize fractions of a whole and parts of a group (e.g., $1/4^{\text{th}}$ of a pie, $2/3^{\text{rd}}$ of 15 balls) (c)
- θ Know that when all fractional parts are included, such as four-fourths, the result is equal to the whole and to one (c)

1.5 Model and solve problems by representing, adding and subtracting amounts of money (c/em)

- θ Solve problems using combinations of coins and bills (c/p/em)
- θ Know and use the decimal notation and the dollar and cents symbols for money (c)
- θ Begin to identify change from a purchase (s)

1.6 Use estimation strategies in computation and problem solving that involve numbers that use the ones, tens hundreds and thousands places (c)

- θ Recognize when an estimate is reasonable (p/c) (e.g., closest inch) (c)
- θ Explore estimation strategies (p)

2.0 Patterns, Functions and Algebra – Students know and understand various types of patterns and functional relationships. They use symbolic forms and models to represent and analyze mathematical structures in both real and abstract contexts.

2.1 Model, represent and interpret number relationships to create and solve problems involving addition and subtraction (c)

- θ Understand and apply the concept of an unknown (p)
- θ Solve addition and subtraction problems using data from simple charts, tables, picture graphs and number sentences (c/s/em)
- θ Relate problem situations and number sentences involving addition and subtraction (c/em)
- θ Use the commutative and associative rules to simplify mental calculations and check results (c/em)
- θ Describe the role of 0 in addition and subtraction (p/s)

2.2 Use patterns when solving problems or analyzing data (c/p/em)

- θ Recognize, describe, extend and explain how to get the next term in linear patterns (e.g., 4, 8, 12...; the number of legs on 1 horse, 2 horses, 3 horses, 4 horses) (c/p/em)
- θ Solve problems involving simple number patterns (c/em)
- θ Look for, extend, and generalize patterns from related examples (p/em)

3.0 Measurement – Students know and understand attributes, units and systems of measurement. They apply a variety of techniques, tools and formulas for determining measurements.

3.1 Understand that measurement requires identifying a unit of measure, repeating that unit and comparing it to the item to be measured (c/em)

- θ Use standard and non-standard units for length, weight, and volume (p)
- θ Measure the length of objects repeating a non-standard or standard unit (c/s/em)
- θ Use different units to measure the same object and predict whether the measure will be greater or smaller when a different unit is used (c/em)
- θ Measure the length of an object to the nearest inch and/or centimeter (c/em)
- θ Estimate units of measurement for metric distances (s)

3.2 Apply concepts about time (c/p/s/em)

- θ Tell time to the nearest quarter hour and know time relationships (e.g., minutes in an hour, days in a month, weeks in a year) (c/p/s/em)
- θ Begin to tell and write time to five minutes using an analog clock (p)
- θ Determine the duration of time intervals in hours (e.g., 11:00am to 4:00pm) (c/s/em)

4.0 Geometry and Spatial Sense – Students know how to analyze characteristics and properties of two- and three-dimensional objects. They select and use different representational systems, including coordinate and graph theory. They understand the usefulness of transformations and symmetry in analyzing mathematical situations. They know how to visualize and to use spatial reasoning to solve problems that cross disciplines.

4.1 Identify and describe the elements that define common figures in the plane, and of common objects in space (c), and relate them to similar objects in the environment (p/em)

- θ Describe and classify plane and solid geometric shapes (e.g., circle, triangle, square, rectangle, sphere, pyramid, cube, rectangular prism, cylinder) according to the number and shape of faces, edges, sides and vertices (c/s/p/em)
- θ Put shapes together and take them apart to form other shapes (e.g., two congruent right triangles can form a rectangle (s)) (c/s/em)
- θ Classify, compare, draw, and/or construct simple geometric figures (p)
- θ Identify a vertex, congruence, and symmetry in figures (s)

4.2 Use spatial organization (p)

- θ Investigate and predict results of combining, subdividing, and changing shapes; (use pattern blocks, fold paper, dissect, tile, rearrange parts of solids) (p)
- θ Use geometric representations—number line, pattern blocks, unifix cubes (p); number grid (em)
- θ Use Venn diagrams for sorting and classifying (p)
- θ Organize space using real objects in multiple arrangements (p)
- θ Identify a rotation and a reflection of an object (s)

5.0 Data Analysis, Statistics, and Probability – Students know how to pose questions and collect, organize, represent and interpret data in order to answer those questions. They use methods of exploratory data analysis to develop and evaluate inferences, predictions, and arguments that are based on data. They understand and know how to apply the notions of chance and probability.

5.1 Collect, record, organize, display and interpret numerical data on bar graphs, and other representations (c/p/em)

- θ Interpret and make reasonable predictions using data from own graph (p), tally charts, and surveys (s)
- θ Record numerical data in systematic ways keeping track of what/who has been counted (c/em)
- θ Represent the same data set in more than one way (e.g., charts with tallies, and bar graphs) (c/em)
- θ Identify features of data sets (range and mode) (c/em)
- θ Ask and answer simple questions related to data representations (c)
- θ Order events by the likelihood of their occurrence (s)

6.0 Problem Solving – Students know that they learn basic skills and concepts in order to use them to solve problems in and out of school. They solve routine and complex problems by drawing from a variety of strategies, including technology, and demonstrate an attitude of persistence and reflection in their approach.

6.1 Make decisions about how to set up a problem (c)

- θ Identify the problem and formulate a possible solution (p)
- θ Decide about the approach, materials and strategies to use (c)
- θ Begin to distinguish relevant, from irrelevant information (p)

6.2 Apply a variety of strategies to solve problems (c/p)

- θ Organize information - begin to eliminate possibilities, guess and check, look for patterns, use a matrix, chart or table, classify by attribute, write a number sentence, look for key words (p)
- θ Choose a focus - use tools such as technology, manipulatives, or sketches to model problems (c), solve related problems, divide problem into smaller parts (p)
- θ Use technology to solve math problems and to practice skills (p)

7.0 Math Processes: Reasoning, Communication, and Connections – Students use reasoning to develop, analyze, draw conclusions, and validate conjectures and arguments. As they reason, they recognize and multiple representations of the same concept. They see the interconnections among math ideas, as well as in other disciplines. They know how to communicate their math thinking clearly and coherently to others, orally, graphically, and in writing, using precise language and symbols.

7.1 Solve problems and justify reasoning

- θ Defend the reasoning used and justify the procedures selected (c)
- θ Make precise calculations and check the validity of the results from the context of the problem (c)

7.2 Communicate math thinking orally, graphically, and in writing (p)

- θ Restate or summarize the problem
- θ Explain math thinking using correct terminology (c/p)
- θ Translate math symbols into written English (p)
- θ Read and understand math in written form (text presentation, word problems, peer solutions) (p)

