

K – 12 MATHEMATICS UNIFYING STANDARDS

- 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.
- 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.
- 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.
- 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.
- 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.
- 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, while demonstrating an attitude of persistence and reflection in their approaches.
- 7.0 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.

MATH STANDARDS LEVEL K

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 between numbers and quantities (c/em)
- 1.2 Begin to explore numbers to 100 (p/em)
- 1.3 Begin to understand that numbers can describe money and fractions (p/em)
- 1.4 Understand and describe simple additions and subtractions (c/em)
- 1.5 Use estimation strategies in computation and problem solving that involve numbers in the ones and tens places (c/p/em)

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 Sort and classify objects (c/p/em)
- 2.2 Begin to identify, describe and extend simple patterns (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 length, weight, capacity and time are properties that can be used for comparison (c/p/em)
- 3.2 Understand the concept of time (c/p)

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 common objects in the environment and describe their geometric features (c/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 and analyze information about objects and events in the environment (c/p)

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/p/em)

6.2 Begin to use tools and strategies to solve problems (c/p/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 begin to justify reasoning (c/p)

7.2 Begin to express math ideas orally, graphically, and in writing (p/em)

7.3 Begin to understand multiple representations of the same concept (p/em)

**MATH STANDARDS
LEVEL K**

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.

1.1 Understand the relationship between numbers and quantities. (c/em)

- θ Recognize that the number of objects in a set remains the same, regardless of the position or arrangement (c)
- θ Count, recognize, represent, name and order numbers to 30 using objects (c)
- θ Compare up to 10 objects and identify which set is equal to, more than, or less than the other. (c)
- θ Know that larger numbers describe sets with more objects in them than smaller numbers (c)
- θ Match sets with numerals from 0 to 10 (em)

1.2 Begin to explore numbers to 100. (p/em)*

- θ Begin to count to 100 with visual cues
- θ Write numerals 0-10
- θ Count forward to 10 and backward from 10
- θ Begin to skip count by 5's to 50 and 10's to 100 and 2's to 30
- θ Begin to use ordinal numbers (first, second, last)
- θ Begin to use a calculator to count and skip count

1.3 Begin to understand that numbers can describe money and fractions. (p/em)

- θ Begin to identify a penny, nickel, dime, quarter, and dollar bill
- θ Know value of penny, nickel, and dime
- θ Begin to identify wholes and halves

1.4 Understand and describe simple additions and subtractions. (c/em)

- θ Use concrete objects to determine the answers to addition and subtraction problems (for two numbers that are each less than 10) (c/p/em)
- θ Begin to write number sentences related to concrete representations (p/em) (i.e., ☺ + ☺☺☺ = ☺☺☺☺☺
 $2 + 3 = 5$)

1.5 Use estimation strategies in computation and problem solving that involve numbers in the ones and tens places. (c/p/em)

- θ Recognize when an estimate is reasonable
- θ Begin to understand the difference between ones and tens

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 Sort and classify objects. (c/p/em)

- θ Identify, sort and classify objects by attribute (colors, shapes, sizes) and identify objects that do not belong to a particular group

2.2 Begin to identify, describe and extend simple patterns. (c/p/em)

- θ Make and describe 2 part patterns* (em)
- θ Identify patterns that involve shape, size, color and number (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.

3.1 Understand that length, weight, capacity and time are properties that can be used for comparison. (c/p/em)

- θ Begin to develop the process of measuring and the concepts related to units of measurement (p/em)
- θ Compare the length, weight and capacity (volume) (p) of objects (c/p/em)
- θ Begin to use non-standard units to measure length, weight and capacity (p/em)

3.2 Understand the concept of time. (c/p)

- θ Name the days of the week (c)
- θ Begin to know months of the year (p)
- θ Understand the concepts and tools that measure time: (c/p/em) morning, afternoon, evening, day, yesterday, tomorrow, week, year, clock, calendar, faster/slower* (em)
- θ Identify time to the nearest hour of everyday events: lunchtime is 12 o'clock, bedtime is 8 o'clock (c)

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 common objects in the environment and describe their geometric features. (c/p/em)

- θ Identify, name, and describe a circle, triangle, square, rectangle, (c/p/em), cube, sphere, cone (c), rhombus, hexagon, trapezoid* (em)
- θ Compare familiar plane and solid objects by common attributes (position, shape, size, roundness, number of corners) (c/em)
- θ Begin to classify, compare, draw, and/or construct simple geometric figures (p/em)

4.2 Use spatial organization. (p)

- θ Begin to use geometric representations (e.g., pattern blocks, unifix cubes, color tiles building blocks)
- θ Draw pictures and/or arrange manipulatives to represent math problems
- θ Begin to investigate and predict results of combining, subdividing, and changing shapes (use pattern blocks, fold paper, dissect, tile, rearrange parts of solids)

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 and analyze information about objects and events in the environment. (c/p)

- θ Pose informational questions, collect data, and record the results using objects, pictures (c), and pictographs (p)
- θ Use concrete and representative graphs to determine more than, less than, or equal to. (p)
- θ Predict a likely outcome based on interpretation of the graph (p)

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 approaches.

6.1 Make decisions about how to set up a problem. (c/p/em)

- θ Begin to consider the approach, materials, and strategies to use in everyday situations and from teacher-read stories (c)

6.2 Begin to use tools and strategies to solve problems. (c/p/em)

- θ Use manipulatives or sketches (c), act out the problem, divide the problem into smaller parts, solve a related problem, guess and check, look for patterns (p)
- θ Begin to use technology to solve math problems and to practice skills. (p)

7.0 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.

7.1 Solve problems and begin to justify reasoning. (c/p)

- θ Use concrete objects and pictures to show reasoning (c).
- θ Begin to identify reasonable answers (p).
- θ Make precise calculations and check the results (c).

7.2 Begin to express math ideas orally, graphically, and in writing. (p/em)

- θ Restate the problem
- θ Begin to use correct terminology
- θ Express ideas using pictures, objects, or words.

7.3 Begin to understand multiple representations of the same concept. (p/em)

- θ Recognize the relationship between concrete models and numerals
- θ Begin to translate physical models into graphic representations
- θ Begin to understand how math skills connect to other situations and curriculum areas