

Mathematics for All Learners

Mathematics



Grades 3-5

MATHEMATICS GRADES 3-5

Standard 1 – Number Sense and Operations		
Students understand and apply number sense, number theory and operations.		
Benchmark 1.5.1 - Students understand numbers, ways of representing numbers, relationships among numbers and number systems.		
<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Round a whole number, 999 or less, to the nearest ten and hundred. Identify and compare the numerical value of two fractions having like and unlike denominators (equivalency). Compare two whole numbers up to six digits using symbols (<,>=) and words. Identify and compare decimals to the hundredths place value. Read and write six-digit numerals and identify the place value for each digit. Name, write and represent fractions using concrete materials and numbers (halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths). 	<ul style="list-style-type: none"> Round whole number, expressed through millions, to the nearest thousand, ten thousand, and hundred thousand. Identify and compare the numerical value of two fractions having like and unlike denominators (equivalency) including improper and mixed number equivalency. Compare fractions using concrete materials and symbols (<,>=). Demonstrate the equivalent relationship of fractions to decimals using concrete materials. Compare two whole numbers, expressed through millions, using symbols and words. Read, write, represent and identify decimals expressed through the thousandths. Round to the nearest tenth and hundredth, using concrete materials. Identify the place value for each digit in a whole number expressed through million. 	<ul style="list-style-type: none"> Read, write, represent and identify decimals expressed through the ten-thousandths. Round to the nearest thousandth. Compare and order whole numbers, fractions, decimals, using concrete materials, and mathematical symbols (<,>=). Identify when one form of a number might be more useful than another. Identify equivalent fractions and relate fractions to decimals and percents and ratios. Read, write, and represent mixed numbers and demonstrate how to change mixed numbers to improper fractions or decimals. Identify the place value for each digit in a whole number expressed through billions.
Benchmark 1.5.2 – Students understand meaning of operations and how they relate to one another.		
<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Recognize and use the inverse relationships between addition/subtraction and multiplication/division to complete basic fact sentences (e.g. fact families). Explore sets using attributes and Venn diagrams. 	<ul style="list-style-type: none"> Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems involving whole numbers. Sort sets using attributes and Venn diagrams. Add and subtract fractions with like and unlike denominators using concrete materials and paper and pencil. 	<ul style="list-style-type: none"> Multiply and divide proper fractions using concrete materials and paper and pencil. Use Venn diagrams or other diagrams to identify relationships. Add, subtract and multiply decimals using concrete materials and paper and pencil. Add and subtract mixed numbers with like and unlike denominators using concrete materials and paper and pencil.
Benchmark 1.5.3 – Students compute fluently and make reasonable estimates.		
<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Solve problems involving the sum or difference of two whole numbers to the thousands place. Mentally add and subtract combinations of whole numbers with reasonable accuracy. Identify procedures and appropriateness in using calculators as a mathematical tool for computation. Add and subtract decimals expressed as tenths and hundredths, using concrete materials and paper and pencil. Memorize multiplication and division facts through ten. Create and solve problems that involve multiplication of a two digit by a one digit number. Add and subtract with proper fractions having like denominators of 12 or less, using concrete materials. Estimate the sum or difference of two digit whole numbers. 	<ul style="list-style-type: none"> Create and solve problems involving addition and subtraction of whole numbers to the 10,000 place using paper/pencil, mental computation and calculators. Find the product of two whole numbers when one factor has two digits or less and the other factor has three digits or less. Estimate and find whole-number sums and difference of three digit numbers, using terms such as close to, between, more. Add, subtract and solve problems involving fractions having like and unlike denominators. Apply procedures and appropriateness in using calculators as mathematical tools for computations. Estimate and find the quotient of two whole numbers given a one-digit divisor. Add, subtract, multiply and divide (with on digit divisor) decimals expressed through the hundredths. Find the quotient of a three-digit dividend with a two digit divisor (including remainder). 	<ul style="list-style-type: none"> Add and subtract fractions and mixed numbers, with and without regrouping, express answers in simplest form. Create and solve problems involving addition/subtraction/multiplication/division of whole numbers. Use appropriate types of estimation to solve real-world problems (e.g. overestimate, underestimate, whole number, decimals, percent, fractions). Given a dividend of four digits or less and a divisor of two digits or less, find the quotient and remainder. Multiply up to a three-digit by three-digit number correctly. Identify the product of two numbers expressed as decimals through thousandths using appropriate method of calculation. Add, subtract, multiply and divide decimals through the thousandths.

Standard 2 – Geometry
Students understand and apply concepts of geometry.

Benchmark 2.5.1 - Students analyze and apply characteristics and properties of one-, two- and three- dimensional figures and develop mathematical justifications about geometric relationships.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Identify and describe attributes of three-dimensional shapes according to the number of faces, edges, bases, and vertices (corners). Identify, describe and name regular polygons by number of sides. Identify and describe congruent and symmetrical two-dimensional shapes. Identify and draw line segments and angles, (acute, obtuse, and right) using a ruler or straight edge. Describe the relationship between and among points, lines, line segments, vertices and rays. 	<ul style="list-style-type: none"> Name and classify three-dimensional shapes. Identify, describe and name the attributes of regular polygons including names of polygons. (e.g. lines of symmetry, angles, sides, names, etc). Define, compare and construct points, lines, line segments, vertices, rays and angles. Identify, draw and measure basic angles (acute, right, and obtuse). Identify and describe the diameter, radius, chord and circumference of a circle. Describe, compare and draw shapes using such concepts as parallel, perpendicular and intersecting. Construct congruent or symmetrical two-dimensional shapes. 	<ul style="list-style-type: none"> Sort and classify shapes and solids using two or more attributes. Identify, describe and name the attributes of regular and irregular polygons including names of polygons. (e.g. lines of symmetry, angles, sides, names, etc). Identify representations of angles (90°, 180°, 270°, 360°) within a circle. Identify, draw and measure all angles including straight and reflex. Analyze the diameter, radius, chord and circumference of a circle (e.g. relationship between diameter and circumference – pi).

Benchmark 2.5.2 - Students specify location and describe spatial relationships using coordinate geometry and other representational systems.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Use a coordinate system to specify a location, such as on a map. Explore intermediate directions such as NW, SE, SW, and NE. 	<ul style="list-style-type: none"> Use a coordinate system to describe a path. Describe location using geometric vocabulary (e.g. a 90-degree turn). Use intermediate directions such as NW, SE, SW, and NE. 	<ul style="list-style-type: none"> Create a coordinate system to solve a real world problem. Find the distance between points along horizontal and vertical lines of a coordinate system.

Benchmark 2.5.3 - Students apply transformation and use symmetry to analyze mathematical situations.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Identify and demonstrate slides (translations), flips (reflections), and turns (rotations). Predict and verify the effects of combining, subdividing and changing basic shapes (e.g. using pattern blocks and tangrams). 	<ul style="list-style-type: none"> Identify, demonstrate and solve problems using turns (rotations), flips (reflections), slides (translations) and tessellations. Identify symmetrical patterns. Predict and verify the effects of combining, subdividing and changing basic shapes (e.g. using paper and pencil). 	<ul style="list-style-type: none"> Manipulate geometric shapes using flips (reflections), turns (rotations), slides (translations) and tessellations to demonstrate congruency. Create symmetrical patterns.

Benchmark 2.5.4 - Students use visualization, spatial reasoning, and geometric modeling to solve problems.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Build and describe geometric objects. Identify patterns and paths. Explore the use of geometric models to solve problems in other areas of mathematics such as number and measurement. 	<ul style="list-style-type: none"> Build and draw geometric objects. Describe and demonstrate patterns and paths. Use geometric models to solve problems in the other areas of mathematics. 	<ul style="list-style-type: none"> Identify and build a three-dimensional object from a two-dimensional representation of that object. Develop a geometric model to solve problems in other areas of mathematics.

Standard 3 – Data Analysis and Probability
Students understand and apply the concepts of data analysis, probability and statistics.

Benchmark 3.5.1 - Students formulate questions that can be addressed with data and collect, organize and display data to answer them.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> • Explore an investigation in which data can be collected and displayed using a graph. • Explore the use of technology to create tables and graphs. • Read and interpret data represented in bar, pie and picture graphs. 	<ul style="list-style-type: none"> • Investigate data which can be collected and displayed using an appropriate graph. • Use a computer to create tables and graphs. • Read and interpret data represented in various graphs (e.g. line and double bar). 	<ul style="list-style-type: none"> • Explain the basic concepts of sample bias and sample size when designing a survey. • Design investigations to which data can be collected and displayed using an appropriate graph. • Use a computer to design spreadsheets and graphs. • Recognize the difference between categorical and numerical data.

Benchmark 3.5.2 – Students select and use appropriate statistical methods to analyze data.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> • Summarize and interpret data. • Make predictions based on data results. 	<ul style="list-style-type: none"> • Find the minimum, maximum and range. • Explore mean, median, mode and outlier. 	<ul style="list-style-type: none"> • Find the mean, range and median of a set of data. • Recognize different representations of the same data and evaluate how well each representation shows important aspects of the data.

Benchmark 3.5.3 – Students develop and evaluate inferences and predications that are based on data.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> • Explore the influences of sample size and population. • Using various displays of data, interpret and draw conclusions. 	<ul style="list-style-type: none"> • Apply the concepts of bias, sample size and population. • Read data represented as specific pieces of information from real-world settings; newspapers, magazines and other texts. • Using the various displays of data, interpret, formulate questions and draw conclusions. 	<ul style="list-style-type: none"> • Analyze the influences of bias, sample size and population. • Using the various displays of data, formulate questions and design studies to further investigate and draw final conclusions.

Benchmark 3.5.4 – Students understand and apply basic concepts of probability.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> • Explore the concept of chance and describe events as certain, equally likely or impossible. 	<ul style="list-style-type: none"> • Use various strategies of chance and describe events as certain, equally likely or impossible. 	<ul style="list-style-type: none"> • Predict the probability of outcomes of simple experiments and test the conclusions. • Identify that when the past conditions remain the same, they can be used to predict future events. • Recognize that the measure of the likelihood of an event can be represented by a number from zero to one.

Standard 4 – Measurement
Students understand and apply the concepts of measurement.

Benchmark 4.5.1 – Students understand measurable attributes of objects and the units, systems, and processes of measurement.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> • Use Metric and U.S. Customary units for estimating and measuring length, capacity/volume, and mass using the concepts of more, less, and equivalent. • Recognize the difference between perimeter and area using centimeter graph paper. • Compare objects and numbers using most/least, same/different, shortest/longest, greater than/less than, and equal. • Develop a sense of time using analog and digital clocks. • Use time: minutes, hours, days, months, and years in real world experiences. • Explore elapsed time in hours and minutes within a 24-hour period of time. 	<ul style="list-style-type: none"> • Estimate and measure mass, length, and volume using U.S. Customary and Metric units. • Explain the relationship between the units of measurement within the same system: volume, mass, and length in the metric system and customary system. • Recognize the difference between perimeter and area using centimeter graph paper and formulas. • Tell time to the nearest minute using analog clocks. • Identify time using minutes, hours, days, months, years, centuries, and decades. • Identify angles (acute, obtuse, right, and straight). • Explore measuring geometric angles using degrees. • Calculate elapsed time in hours, days, and months. 	<ul style="list-style-type: none"> • Measure and compare mass, length, and volume using U.S. Customary and Metric units. • Convert simple units of volume, mass, and length within the metric or customary system. (e.g. cm. to meters). • Know the difference between perimeter and area using formulas for squares and rectangles. • Identify time and elapsed time using minutes, hours, days, months, years, centuries, and decades. • Identify straight and reflex angles. • Measure geometric angles using degrees.

Benchmark 4.5.2 – Students apply appropriate techniques, tools, and formulas to determine measurement.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> • Estimate and measure to the nearest centimeter, meter, inch, foot and yard. • Compare money amounts and make change up to \$5.00. • Explore and apply appropriate units and tools to measure. • Read temperature to the nearest degree in Celsius and Fahrenheit and be able to make general comparisons between the two (e.g. Celsius and Fahrenheit freezing pt.). 	<ul style="list-style-type: none"> • Measure to the nearest ½ inch and millimeter. • Compare money amounts and make change up to \$10.00. • Estimate, measure, and compare perimeter and area. • Select and apply appropriate units and tools to estimate and measure length, area, volume, mass, time, money, angles and temperature. 	<ul style="list-style-type: none"> • Measure to the nearest fractional part of an inch (1/4, 1/2, 3/4, etc.) and decimal relationship of cm. to meter. • Identify concepts within consumer math (e.g. wages, budget, discounts, saving accounts, unit costs). • Estimate the area of irregular shapes using squares, rectangles, and triangles. • Estimate, measure, calculate and compare the perimeter and area of squares, rectangles, triangles, and real world objects. • Interpret and apply elapsed time and time zones.

Standard 5 – Algebra
Students understand and apply algebraic concepts, function, patterns, and relationships.

Benchmark 5.5.1 – Students understand patterns, relations and functions.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Recognize and describe patterns using whole numbers (0-9,999). Analyze a given pattern and then create a pattern with similar attributes. Describe geometric and numeric patterns. Explore algebraic functions (e.g. input/output function machines). 	<ul style="list-style-type: none"> Construct a pattern and articulate why the pattern works. Recognize that mathematics is the study of patterns that includes numbers, shapes and the operations applied to them. Extend geometric and numeric patterns. 	<ul style="list-style-type: none"> Examine mathematics as the study of patterns that includes numbers, shapes and the operations applied to them. Construct a pattern and articulate why the pattern works. Make generalizations about geometric and numeric patterns.

Benchmark 5.5.2 – Students represent and analyze mathematical situations and structure algebraically, numerically, and graphically.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Investigate and describe the concept of a variable ($8 + x = 13$). Recognize that a variable represents an unknown quantity. 	<ul style="list-style-type: none"> Solve for the variable in an algebraic equation. 	<ul style="list-style-type: none"> Represent mathematical relationships using expressions and equations. Identify properties such as commutative and associative and use them to compute. Apply the order of operations not including exponents.

Benchmark 5.5.3 – Students use mathematical models to represent and understand quantitative relationships.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Recognize mathematical sentences can be used to solve problems. 	<ul style="list-style-type: none"> Develop algorithms to solve problems. 	<ul style="list-style-type: none"> Create and apply algorithms to solve problems using graphs, tables and equations.

Benchmark 5.5.4 – Students analyze change in various contexts.

<i>Third Grade Critical Knowledge</i>	<i>Fourth Grade Critical Knowledge</i>	<i>Fifth Grade Critical Knowledge</i>
<ul style="list-style-type: none"> Explore rate of change. 	<ul style="list-style-type: none"> Analyze rate of change. Think of example!!!! 	<ul style="list-style-type: none"> Investigate how a change in one variable relates to change in a second variable. Identify and describe situations with constant or varying rates of change and compare them.