

Mathematics 3-4

Number, Number Sense and Operations Standard

Students demonstrate number sense including an understanding of number systems and operations, and how they relate to one another. Students compute fluently and make reasonable estimates using paper and pencil, technology-supported and mental methods

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> • Use place value concepts to represent whole numbers and decimals using numerals, words, expanded notation and physical models. For example: <ul style="list-style-type: none"> ➤ Recognize 100 means 10 tens as well as a single entity (1 hundred) through physical models and trading games. ➤ Describe the multiplicative nature of the number system; e.g., the structure of 3205 as 3×1000 plus 2×100 plus 5×1. ➤ Model the size of 1000 in multiple ways; e.g., packaging 1000 objects into 10 boxes of 100, modeling a meter with centimeter and decimeter strips, or gathering 1000 op-can tables. ➤ Explain the concept of tenths and hundredth using physical models, such as metric pieces, base ten blocks, decimal squares or money. • Use mathematical language and symbols to compare and order ; e.g., less than greater than, at most, at least, $<$, $>$, $=$, \div. 	<ul style="list-style-type: none"> • Use place value structure of the base-ten number system to read, write, represent and compare whole numbers through millions and decimals through thousandths. • Round whole numbers to a given place value. 	A. Use place value structure of the base-ten number system to read, write, represent and compare whole numbers and decimals		6
<ul style="list-style-type: none"> • Identify and generate equivalent forms of whole numbers; e.g., 36, $30 + 6$, 9×4, $46 - 10$. • Recognize and use decimal and fraction concepts and notations as related ways of representing parts of a whole or a set; e.g., 3 of 10 marbles are red can also be described as $3/10$ and 3 tenths are red. 	<ul style="list-style-type: none"> • Identify and generate equivalent forms of fractions and decimals 	B. Recognize and generate equivalent representations for whole numbers, fractions and decimals		6
<ul style="list-style-type: none"> • Represent fractions and mixed numbers using words, numerals and physical models. 		C. Represent commonly used fractions and mixed numbers using words and physical models		3

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<ul style="list-style-type: none"> • Use mathematical language and symbols to compare and order ; e.g., less than greater than, at most, at least, $<$, $>$, $=$, \div. • Compare and order commonly used fractions and mixed numbers using number lines; models (such as fraction circles or bars), points of reference (such as more or less than $1/2$), and equivalent forms found using physical or visual models. 	<ul style="list-style-type: none"> • Use models and points of reference to compare commonly used fractions. 	D. Use models, points of reference and equivalent forms of commonly used fractions to judge the size of fractions and to compare, describe and order them.		4
	<ul style="list-style-type: none"> • Identify and represent factors and multiples of whole numbers through 100, and classify numbers as prime or composite. 	E. Recognize and classify numbers as prime or composite and list factors.		6
<ul style="list-style-type: none"> • Count money and make change using coins and paper bills to ten dollars. 	<ul style="list-style-type: none"> • Solve problems involving counting money and making change, using both coins and paper bills. 	F. Count money and make change using both coins and paper bills.		2

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3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> • Model and use the commutative and associative properties for addition and multiplication. 		G. Model and use commutative and associative properties for addition and multiplication		3
<ul style="list-style-type: none"> • Explain and use relationships between operations, such as: <ul style="list-style-type: none"> ➤ relate addition and subtraction as inverse operations; ➤ relate multiplication and division as inverse operations; ➤ relate addition to multiplication (repeated addition); ➤ relate subtraction to division (repeated subtraction). 		H. Use relationships between operations such as subtraction as the inverse of addition and division as the inverse of multiplication		3
<ul style="list-style-type: none"> • Demonstrate fluency in multiplication facts through 10 and corresponding division facts. 	<ul style="list-style-type: none"> • Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten. 	I. Demonstrate fluency in multiplication facts with factors through 10 and corresponding divisions		1

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3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Demonstrate fluency in multiplication facts through 10 and corresponding division facts. Evaluate the reasonableness of computations based upon operations and the numbers involved. 	<ul style="list-style-type: none"> Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies. 	J. Estimate the results of whole number computations using a variety of strategies, and judge the reasonableness		7
<ul style="list-style-type: none"> Add and subtract whole numbers with and without regrouping. Divide 2- and 3-digit numbers by a single-digit number, without remainders for division. 	<ul style="list-style-type: none"> Solve problems involving counting money and making change, using both coins and paper bills. Use associative and distributive properties to simplify and perform computations. Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders; e.g., situations involving measurement, money. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division using an <u>organized approach</u>. 	K. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division of whole numbers		5
<ul style="list-style-type: none"> Model, represent and explain multiplication; e.g., repeated addition, skip counting, rectangular arrays and area model. Model, represent and explain division; e.g., sharing equally, repeated subtraction, rectangular arrays and area model. 	<ul style="list-style-type: none"> Develop and explain strategies for performing computations mentally. Use a variety of methods and appropriate tools for computing with whole numbers; e.g., mental math, paper and pencil, and calculator. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten. 	L. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers		9
	<ul style="list-style-type: none"> Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies. Use physical models, visual representations, and paper and pencil to add and subtract decimals and commonly used fractions with like denominators. 	M. Add and subtract commonly used fractions with like denominators and decimals, using models and paper and pencil		2

Mathematics 3-4

Measurement Standard

Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> • Identify and select appropriate units for measuring: <ul style="list-style-type: none"> ➤ length – miles, kilometers and other units of measure as appropriate. ➤ volume – gallons; ➤ weight – ounces, pounds, grams, or kilograms; ➤ temperature – degrees (Fahrenheit or Celsius). • Read thermometers in both Fahrenheit and Celsius scales. 	<ul style="list-style-type: none"> • Identify and select appropriate units to measure perimeter, area and volume. 	A. Select appropriate units for perimeter, area, weight, volume (capacity), time and temperature, using: <ul style="list-style-type: none"> • objects of uniform size; • U.S. customary units; e.g., mile, square inch, cubic inch, second degree Fahrenheit, and other units as appropriate; • metric units; e.g., millimeter, kilometer, square centimeter, kilogram, cubic centimeter, degree Celsius, and other units as appropriate. 		9
	<ul style="list-style-type: none"> • Relate the number of units to the size of the units used to measure an object; e.g., compare the number of cups to fill a pitcher to the number of quarts to fill the same pitcher. 	B. Know that the number of units is inversely related to the size of the unit for any item being measured.		3

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Measurement Standard

Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> • Establish personal or common references to include additional units. • Estimate and measure length, weight and volume (capacity), using metric and U.S. customary units, accurate to the nearest 1/2 or 1/4 unit as appropriate. 	<ul style="list-style-type: none"> • Demonstrate and describe perimeter as surrounding an area as covering a two-dimensional shape, and volume as filling a three-dimensional object. 	C. Develop common referents for units of measure for length, weight, volume (capacity) and time to make comparisons and estimates.		10
<ul style="list-style-type: none"> • Read thermometers in both Fahrenheit and Celsius scales. • Use appropriate measurement tools and techniques to construct a figure or approximate an amount of specified length, weight or volume (capacity); e.g., construct a rectangle with length 2 1/2 inches and width 3 inches, fill a measuring cup to the 3/4 cup mark. • Make estimates for perimeter, area and volume. 	<ul style="list-style-type: none"> • Develop and use strategies to find perimeter using string or links, area using tiles or a grid, and volume using cubes. 	D. Identify appropriate tools and apply counting techniques for measuring side lengths, perimeter and area of squares, rectangles, and simple irregular two-dimensional shapes, volume of rectangular prisms, and time and temperature.		14
<ul style="list-style-type: none"> • Tell time to the nearest minute and find elapsed time using a calendar or a clock. 		E. Tell time to the nearest minute.		4

Mathematics 3-4

Geometry and Spatial Sense Standard

Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects and transformations to analyze mathematical situations and solve problems.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Analyze and describe properties of two-dimensional shapes and three-dimensional objects using terms such as vertex, edge, angle, side and face. 	<ul style="list-style-type: none"> Identify similarities and differences of quadrilaterals. Identify and define triangles based on angle measures (equiangular, right, acute and obtuse triangles) and side lengths (isosceles, equilateral and scalene triangles). 	A. Provide rationale for groupings and comparisons of two-dimensional figures and three-dimensional objects		8
	<ul style="list-style-type: none"> Describe points, lines and planes, and identify models in the environment. 	B. Describe and identify points, lines and planes in the environment		3
	<ul style="list-style-type: none"> Identify, describe and model intersecting, parallel and perpendicular lines and line segments. 	C. Describe and identify intersecting, parallel and perpendicular lines or segments in the environment		0

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Geometry and Spatial Sense Standard

Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects and transformations to analyze mathematical situations and solve problems.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> • Identify and describe the relative size of angles with respect to right angles as follows: <ul style="list-style-type: none"> ➤ Use physical models, like straws, to make different sized angles by opening and closing the sides, not by changing the side lengths. ➤ Identify, classify and draw right, acute, obtuse and straight angles. 		D. Identify and draw right, obtuse, acute and straight angles		5
<ul style="list-style-type: none"> • Analyze and describe properties of two-dimensional shapes and three-dimensional objects using terms such as vertex, edge, angle, side and face. • Build a three-dimensional model of an object composed of cubes. 	<ul style="list-style-type: none"> • Describe, classify, compare and model two- and three-dimensional objects using their attributes. 	E. Use attributes to describe, classify and sketch plane figures and build solid objects.		10
	<ul style="list-style-type: none"> • Identify similarities and differences of quadrilaterals. • Identify and define triangles based on angle measures (equiangular, right, acute and obtuse triangles) and side lengths (isosceles, equilateral and scalene triangles). 	F. Develop definitions of classes of shapes		2

Mathematics 3-4

Geometry and Spatial Sense Standard

Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects and transformations to analyze mathematical situations and solve problems.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Find and name locations on a labeled grid or coordinate system. 	<ul style="list-style-type: none"> Specify locations and plot ordered pairs on a coordinate plane, using first quadrant points. 	G. Find and name locations in coordinate systems		3
<ul style="list-style-type: none"> Draw lines of symmetry to verify symmetrical two-dimensional shapes. 		H. Identify and describe line and rotational symmetry in two-dimensional shapes and designs		3
	<ul style="list-style-type: none"> Identify, describe and use reflections, rotations, and translations in solving geometric problems. 	I. Describe, identify and model reflections, rotations and translations, using physical materials.		2
	<ul style="list-style-type: none"> Identify, describe and use reflections, rotations, and translations in solving geometric problems. 	J. Describe a motion or series of transformations that show two shapes are congruent		2

Mathematics 3-4

Patterns, Functions and Algebra Standard

Students use patterns, relations and functions to model, represent and analyze problem situations that involve variable quantities. Students analyze, model and solve problems using various representations such as tables, graphs and equations

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Extend multiplicative and growing patterns, and describe the pattern or rule in words. Analyze and replicate arithmetic sequences with and without a calculator. 	<ul style="list-style-type: none"> Represent and analyze patterns and functions using words, tables and graphs. 	A. Analyze and extend patterns, and describe the rule in words		13
<ul style="list-style-type: none"> Use patterns to make predictions, identify relationships, and solve problems. 	<ul style="list-style-type: none"> Use models and words to describe, extend and make generalizations of patterns and relationships occurring in computation, numerical patterns, geometry, graphs and other applications. 	B. Use patterns to make predictions, identify relationships, and solve problems.		7
<ul style="list-style-type: none"> Write, solve and explain simple mathematical statements, such as $7 + _ > 8$ or $_ + 8 = 10$. express mathematical relationships as equations and inequalities. 	<ul style="list-style-type: none"> Represent mathematical relationships with equations or inequalities. 	C. Write and solve open sentences and explain strategies.		5
	<ul style="list-style-type: none"> Use models and words to describe, extend and make generalizations of patterns and relationships occurring in computation, numerical patterns, geometry, graphs and other applications. 	D. Represent an unknown quantity as a variable using a symbol, including letters		5

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Patterns, Functions and Algebra Standard

Students use patterns, relations and functions to model, represent and analyze problem situations that involve variable quantities. Students analyze, model and solve problems using various representations such as tables, graphs and equations

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Model problem situations using objects, pictures, tables, numbers, letters and other symbols. 	<ul style="list-style-type: none"> Use rules and variables to describe patterns and other relationships. 	E. Use variables to create and solve equations representing problem situations		6
<ul style="list-style-type: none"> Create tables to record, organize and analyze data to discover patterns and rules. 	<ul style="list-style-type: none"> Construct a table of values to solve problems associated with a mathematical relationships. 	F. Construct and use a table of values to solve problems associated with mathematical relationships		6
<ul style="list-style-type: none"> Identify and describe quantitative changes, especially those involving addition and subtraction; e.g., the height of water in a glass becoming 1 centimeter lower each week due to evaporation. 	<ul style="list-style-type: none"> Describe how a change in one variable affects the value of a related variable. 	G. Describe how a change in one variable affects the value of a related variable		3

Mathematics 3-4

Data Analysis and Probability Standard

Students pose questions and collect, organize, represent, interpret and analyze data to answer those questions. Students develop and evaluate inferences, predictions and arguments that are based on data.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Collect and organize data from an experiment, such as recording and classifying observations or measurements. 	<ul style="list-style-type: none"> Create a plan for collecting data for a specific purpose. 	A. Gather and organize data from surveys and classroom experiments, including data collected over a period of time.		2
<ul style="list-style-type: none"> Support a conclusion or prediction orally and in writing, using information in a table or graph. Match a set of data with a graphical representation of the data. Analyze and interpret information represented on a time line. 	<ul style="list-style-type: none"> Represent and interpret data using tables, bar graphs, line plots and line graphs. Propose and explain interpretations and predictions based on data displayed in tables, charts and graphs. 	B. Read and interpret tables, charts, graphs (bar, picture, line, line plot), and timelines as sources of information, identify main idea, draw conclusions, and make predictions		7
<ul style="list-style-type: none"> Translate information freely among charts, tables, line plots, picture graphs and bar graphs; e.g., create a bar graph from the information in a chart. 	<ul style="list-style-type: none"> Represent and interpret data using tables, bar graphs, line plots and line graphs. Interpret and construct Venn diagrams to sort and describe data. Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data. 	C. Construct charts, tables and graphs to represent data, including picture graphs, bar graphs, line graphs, line plots and Venn diagrams.		4
<ul style="list-style-type: none"> Draw and interpret picture graphs in which a symbol or picture represents more than one object. Read, interpret and construct bar graphs with intervals greater than one. 		D. Read, interpret and construct graphs in which icons represent more than a single unit or intervals greater than one; e.g., each 🍏 = 10 apples or the intervals on an axis are multiples of 10.		5

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Students pose questions and collect, organize, represent, interpret and analyze data to answer those questions. Students develop and evaluate inferences, predictions and arguments that are based on data.

3	4	BENCHMARK	When	Freq
<ul style="list-style-type: none"> Identify the mode of a data set and describe the information it gives about a data set. 	<ul style="list-style-type: none"> Describe the characteristics of a set of data based on a graphical representation, such as range of the data, clumps of data, and holes in the data. Identify the median of a set of data and describe what it indicates about the data. Use range, median and mode to make comparisons among related sets of data. 	E. Describe data using mode, median and range		6
<ul style="list-style-type: none"> Conduct a simple experiment or simulation of a simple event, record the results in a chart, table or graph, and use the results to draw conclusions about the likelihood of possible outcomes. 	<ul style="list-style-type: none"> Conduct simple probability experiments and draw conclusions from the results. Represent the likelihood of possible outcomes for chance situations. Relate the concepts of impossible and certain-to-happen events to the numerical values of 0 (impossible) and 1 (certain). Place events in order of likelihood and use a diagram or appropriate language to compare the chance of each event occurring; e.g. impossible, unlikely, equal, likely, certain. 	F. Conduct a simple probability experiment and draw conclusions about the likelihood of possible outcomes		6
<ul style="list-style-type: none"> Use physical models, pictures, diagrams and lists to solve problems involving possible arrangements or combinations of two to four objects. 	<ul style="list-style-type: none"> List and count all possible combinations using one member from each of several sets, each containing 2 or 3 members; e.g., the number of possible outfits from 3 shirts, 2 shorts and 2 pair of shoes. 	G. Identify and represent possible outcomes, such as arrangements of a set of up to four members and possible combinations from several sets, each containing 2 or 3 members		5
	<ul style="list-style-type: none"> Represent the likelihood of possible outcomes for chance situations. Relate the concepts of impossible and certain-to-happen events to the numerical values of 0 (impossible) and 1 (certain). 	H. Use the set of possible outcomes to describe and predict events		3