

**MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
KINDERGARTEN**

NUMBER SENSE

1.0 Students understand the relationship between numbers and quantities (i.e., that a set of objects has the same number of objects in different situations regardless of its position or arrangement)

K.1.2	Count, recognize, represent, name, and order a number of objects (up to 30).	
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2.0 Students understand and describe simple additions and subtractions

K.2.1	Use concrete objects to determine the answers to addition and subtraction problems (for two numbers that are each less than 10).	
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ALGEBRA AND FUNCTIONS

1.0 Students sort and classify objects

K.1.1	Identify, sort, and classify objects by attribute and identify objects that do not belong to a particular group (e.g., all these balls are green, those are red).	
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MEASUREMENT AND GEOMETRY

1.0 Students understand the concept of time and units to measure it; they understand that objects have properties, such as length, weight, and capacity, and that comparisons may be made by referring to those properties

K.1.1	Compare the length, weight, and capacity of objects by making direct comparisons with reference objects (e.g., note which object is shorter, longer, taller, lighter, heavier, or holds more).	
K.1.2	Demonstrate an understanding of concepts of time (e.g., morning, afternoon, evening, today, yesterday, tomorrow, week, year) and tools that measure time (e.g., clock, calendar).	
K.1.3	Name the days of the week.	
K.1.4	Identify the time (to the nearest hour) of everyday events (e.g., lunch time is 12 o'clock; bedtime is 8 o'clock at night).	

MEASUREMENT AND GEOMETRY - Cont.

2.0 Students identify common objects in their environment and describe the geometric features

K.2.1	Identify and describe common geometric objects (e.g., circle, triangle, square, rectangle, cube, sphere, cone).	
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STATISTICS, DATA ANALYSIS AND PROB.

1.0 Students collect information about objects and events in their environment

K.1.1	Pose information questions; collect data; and record the results using objects, pictures, and picture graphs.	
K.1.2	Identify, describe, and extend simple patterns (such as circles or triangles) by referring to their shapes, sizes, or colors.	

MATHEMATICAL REASONING

2.0 Students solve problems in reasonable ways and justify their reasoning

K.2.1	Explain the reasoning used with concrete objects and/or pictorial representations.	
K.2.2	Make precise calculations and check the validity of the results in the context of the problem.	

MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
FIRST GRADE

NUMBER SENSE

1.0 Students understand and use numbers up to 100

1.1.1	Count, read, and write whole numbers to 100.	
1.1.2	Compare and order whole numbers to 100 by using the symbols for less than, equal to, or greater than (<, =, >).	
1.1.4	Count and group objects in ones and tens (e.g., three groups of 10 and 4 equals 34, or 30 + 4).	
1.1.5	Identify and know the value of coins and show different combinations of coins that equal the same value.	

2.0 Students demonstrate the meaning of addition and subtraction and use these operations to solve problems

1.2.1	Know the addition facts (sums to 20) and the corresponding subtraction facts and commit them to memory.	
1.2.4	Count by 2s, 5s, and 10s to 100.	
1.2.5	Solve addition and subtraction problems with one- and two- digit numbers (e.g., $5 + 58 =$).	
1.2.7	Find the sum of three one-digit numbers.	

3.0 Students use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, and hundreds places

1.3.1	Make reasonable estimates when comparing larger or smaller numbers.	
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ALGEBRA AND FUNCTIONS

1.0 Students use number sentences with operational

symbols and expressions to solve problems

1.1.1	Write and solve number sentences from problem situations that express relationships involving addition and subtraction.	
1.1.2	Understand the meaning of the symbols +, -, =.	

MEASUREMENT AND GEOMETRY

1.0 Students use direct comparison and nonstandard units to describe the measurements of objects

1.1.2	Tell time to the nearest half hour and relate time to events (e.g., before/after, shorter/longer).	
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STATISTICS, DATA ANALYSIS AND PROB.

1.0 Students organize, represent, and compare data by category on simple graphs and charts

1.1.1	Sort objects and data by common attributes and describe the categories.	
1.1.2	Represent and compare data (e.g., largest, smallest, most often, least often) by using pictures, bar graphs, tally charts, and picture graphs.	

MATHEMATICAL REASONING

1.0 Students make decisions about how to set up a problem

1.1.1	Determine the approach, materials, and strategies to be used.	
1.1.2	Use tools, such as manipulatives or sketches, to model problems.	

2.0 Students solve problems and justify their reasoning

1.2.1	Explain the reasoning used and justify the procedures selected.	
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MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
SECOND GRADE

NUMBER SENSE

1.0 Students understand the relationship between numbers, quantities, and place value in whole numbers up to 1,000

2.1.1	Count, read, and write whole numbers to 1,000 and identify the place value for each digit.	
2.1.2	Use words, models, and expanded forms (e.g., $45 = 4 \text{ tens} + 5$) to represent numbers (to 1,000).	
2.1.3	Order and compare whole numbers to 1,000 by using the symbols $<$, $=$, $>$.	

2.0 Students estimate, calculate, and solve problems involving addition and subtraction of two- and three-digit numbers

2.2.2	Find the sum or difference of two whole numbers up to three digits long.	
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3.0 Students model and solve simple problems involving multiplication and division

2.3.3	Know the multiplication tables of 2s, 5s, and 10s (to "times 10") and commit them to memory.	
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4.0 Students understand that fractions and decimals may refer to parts of a set and parts of whole

2.4.2	Recognize fractions of a whole and parts of a group (e.g., one-fourth of a pie, two-thirds of 15 balls).	
2.4.3	Know that when all fractional parts are included, such as four-fourths, the result is equal to the whole and to one.	

5.0 Students model and solve problems by representing, adding, and subtracting amounts of money

2.5.1	Solve problems using combinations of coins and bills.	
2.5.2	Know and use the decimal notation and the dollar and cent symbols for money.	

ALGEBRA AND FUNCTIONS

1.0 Students model, represent, and interpret number relationships to create and solve problems involving addition and subtraction

2.1.3	Solve addition and subtraction problems by using data from simple charts, picture graphs, and number sentences.	
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MEASUREMENT AND GEOMETRY

1.0 Students understand that measurement is accomplished by identifying a unit of measure iterating (repeating) that unit, and comparing it to the item to be measured

2.1.1	Measure the lengths of objects by iterating (repeating) a nonstandard or standard unit.	
2.1.4	Tell time to the nearest quarter hour and know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year).	

2.0 Students identify and describe the attributes of common figures in the plane and of common objects in space

2.2.1	Describe and classify plane and solid geometric shapes (e.g., circle, triangle, square, rectangle, sphere, pyramid, cube, rectangular prism) according to the number and shape of faces, edges, and vertices.	
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MATHEMATICAL REASONING

1.0 Students make decisions about how to set up a problem

2.1.1	Determine the approach, materials, and strategies to be used.	
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2.0 Students solve problems and justify their reasoning

2.2.1	Defend the reasoning used and justify the procedures selected.	
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MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
THIRD GRADE

NUMBER SENSE

1.0 Students understand the place value of whole numbers

3.1.1	Count read, and write whole numbers to 10,000.	
3.1.3	Identify the place value for each digit in numbers to 10,000.	
3.1.4	Round off numbers to 10,000 to the nearest ten, hundred, and thousand.	
3.1.5	Use expanded notation to represent numbers (e.g., $3,206 = 3,000 + 200 + 6$).	

2.0 Students calculate, and solve problems involving

addition, subtraction, multiplication and division

3.2.2	Memorize to automaticity the multiplication table for numbers between 1 and 10.	
3.2.4	Solve simple problems involving multiplication of multidigit numbers by one-digit, numbers ($3,671 \times 3 = \underline{\quad}$).	
3.2.5	Solve division problems in which a multidigit number is evenly divided by a one-digit number ($135/5 = \underline{\quad}$).	
3.2.8	Solve problems that require two or more of the skills mentioned above.	

3.0 Students understand the relationship between

whole numbers, simple fractions, and decimals

3.3.1	Compare fractions represented by drawings or concrete materials to show equivalency and to add and subtract simple fractions in context (e.g., $1/2$ of a pizza is the same amount as $2/4$ of another pizza that is the same size; show that $3/8$ is larger than $1/4$).	
3.3.2	Add and subtract simple fractions (e.g., determine that $1/8 + 3/8$ is the same as $1/2$).	
3.3.3	Solve problems involving addition, subtraction, multiplication, and division of money amounts in decimal notation and multiply and divide money amounts in decimal notation by using whole number-multipliers and divisors.	

MEASUREMENT AND GEOMETRY

1.0 Students choose and use appropriate units and measurement tools to quantify the properties of objects

3.1.2	Estimate or determine the area and volume of solid figures by covering them with squares or by counting the number of cubes that would fill them.	
3.1.3	Find the perimeter of a polygon with integer sides.	

MATHEMATICAL REASONING

2.0 Students use strategies, skills, and concepts in finding solutions

3.2.3	Use a variety of methods, such as words, numbers, symbols, charts, graphs tables, diagrams, and models, to explain mathematical reasoning.	
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MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
FOURTH GRADE

NUMBER SENSE

1.0 Students understand the place value of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers

4.1.2	Order and compare whole numbers and decimals to two decimal places.	
4.1.3	Round whole numbers through the millions to the nearest ten, hundred, thousand, ten thousand, or hundred thousand.	
4.1.5	Explain different interpretations of fractions, for example, parts of a whole, parts of a set, and division of whole numbers by whole numbers; explain equivalents of fractions (see Standard 4.0).	
4.1.8	Use concepts of negative numbers (e.g., on a number line, in counting, in temperature, in "owing").	

2.0 Students extend their use and understanding of whole numbers to the addition and subtraction of simple decimals

4.2.1	Estimate and compute the sum or difference of whole numbers and positive decimals to two places.	
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3.0 Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations

4.3.1	Demonstrate an understanding of, and the ability to use, standard algorithms for the addition and subtraction of multi-digit numbers.	
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4.0 Students know how to factor small whole numbers

4.4.1	Understand that many whole numbers break down in different ways (e.g., $12 = 4 \times 3 = 2 \times 6 = 2 \times 2 \times 3$).	
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ALGEBRA AND FUNCTIONS

1.0 Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences

4.1.1	Use letters, boxes, or other symbols to stand for any number in simple expressions or equations (e.g., demonstrate an understanding and the use of the concept of a variable).	
4.1.2	Interpret and evaluate mathematical expressions that now use parentheses.	
4.1.3	Use parentheses to indicate which operation to perform first when writing expressions containing more than two terms and different operations.	

MATHEMATICAL REASONING

1.0 Students make decisions about how to approach problems

4.1.2	Determine when and how to break a problem into simpler parts.	
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MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
FIFTH GRADE

NUMBER SENSE

1.0 Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers

5.1.1	Estimate, round and manipulate very large (e.g., millions) and very small (thousandths) numbers.	
5.1.2	Interpret percents as a part of a hundred; find decimal and percent equivalents for common fractions and explain why they represent the same value; compute given percent of a whole number.	
5.1.4	Determine the prime factors of all numbers through 50 and write the numbers as the product of their prime factors by using exponents to show multiples of a factor (e.g., $24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$).	

2.0 Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals

5.2.2	Demonstrate proficiency with division, including division with positive decimals and long division with multidigit divisors.	
5.2.3	Solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form.	

ALGEBRA AND FUNCTIONS

1.0 Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results

5.1.1	Use information taken from a graph or equation to answer questions about a problem situation.	
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MATHEMATICAL REASONING

1.0 Students make decisions about how to approach problems

5.1.2	Determine when and how to break a problem into simpler parts.	
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2.0 Students use strategies, skills, and concepts in finding solutions

5.2.3	Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to explain mathematical reasoning.	
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3.0 Students move beyond a particular problem by generalizing to other situations

5.3.2	Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.	
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MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
SIXTH GRADE

NUMBER SENSE

1.0 Students compare and order positive and negative fractions, decimals, and mixed numbers. Students solve problems involving fractions, ratios, proportions, and percentages

6.1.4	Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips.	
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2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division

6.2.1	Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain why a particular operation was used for a given situation.	
6.2.2	Explain the meaning of multiplication and division of positive fractions and perform the calculations (e.g., $5/8$ divided by $15/16 = 5/8 \times 16/15 = 2/3$).	
6.2.3	Solve addition, subtraction, multiplication, and division problems, including those arising in concrete situations, that use positive and negative integers and combinations of these operations.	
6.2.4	Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).	

ALGEBRA AND FUNCTIONS

2.0 Students analyze and use tables, graphs, and rules to solve problems involving rates and proportions

6.2.1	Convert one unit of measurement to another (e.g., from feet to miles, from centimeters to inches).	
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MEASUREMENT AND GEOMETRY

1.0 Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems.

6.1.1	Understand the concept of a constant such as π ; know the formulas for the circumference and area of a circle.	
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STATISTICS, DATA ANALYSIS, & PROB.

1.0 Students compute and analyze statistical measurements for data sets

6.1.1 CAHSEE	Compute the range, mean, median, and mode of data sets.	
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2.0 Students use data samples of a population and describe the characteristics and limitations of the samples

6.2.5 CAHSEE	Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims.	
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3.0 Students determine theoretical and experimental probabilities and use these to make predictions about events

6.3.4	Understand the probability of either of two disjoint events occurring is the sum of the two individual probabilities and that the probability of one event following another, in independent trials, is the product of the two probabilities.	
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MATHEMATICAL REASONING

1.0 Students make decisions about how to approach problems

6.1.3	Determine when and how to break a problem into simpler parts.	
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2.0 Students use strategies, skills, and concepts in finding solutions

6.2.5	Express the solutions clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.	
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MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
SEVENTH GRADE

NUMBER SENSE

1.0 Students know the properties of, and compute

with, rational numbers expressed in a variety of forms

7.1.1 CAHSEE	Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.	
7.1.2 CAHSEE	Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.	
7.1.3 CAHSEE	Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.	
7.1.6 CAHSEE	Calculate the percentage of increases and decreases of a quantity.	
7.1.7 CAHSEE	Solve problems that involve discounts, markups, Commissions, and profit and compute simple and compound interest.	

2.0 Students use exponents, powers, and roots and

use exponents in working with fractions

7.2.1 CAHSEE	Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.	
7.2.2 CAHSEE	Add and subtract fractions by using factoring to find common denominators.	
7.2.4	Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why.	
7.2.5 CAHSEE	Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.	

MEASUREMENT AND GEOMETRY

1.0 Students choose appropriate units of measure

and use ratios to convert within and between

measurement systems to solve problems

7.1.1 CAHSEE	Compare weights, capacities, geometric measures, times and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).	
7.1.3 CAHSEE	Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.	

STATISTICS, DATA ANALYSIS, & PROB.

1.0 Students collect, organize and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program

7.1.1 CAHSEE	Know various forms of display for data sets, including a stem-and-leaf plot or box-and whisker plot; use the forms to display single set of data or to compare two sets of data.	
7.1.2 CAHSEE	Represent two numerical variables on a scatterplot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level).	
7.1.3 CAHSEE	Understand the meaning of, and be able to compute, the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set.	

MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
SEVENTH GRADE

MATHEMATICAL REASONING

1.0 Students make decisions about how to approach problems

7.1.1 CAHSEE	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.	
7.1.3	Determine when and how to break a problem into simpler parts.	

2.0 Students use strategies, skills, and concepts in finding solutions

7.2.1 CAHSEE	Use estimation to verify reasonableness of calculated results.	
7.2.3 CAHSEE	Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.	

MATHEMATICS ESSENTIAL STANDARDS CHECKLIST
EIGHTH GRADE

ALGEBRA I

Symbolic reasoning and calculations with symbols are central in algebra. Through the study of algebra, a student develops and understanding of the symbolic language of mathematics and the sciences. In addition, algebraic skills and concepts are developed and used in a wide variety of problem-solving situations

2.0 CAHSEE	Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.	
3.0 CAHSEE	Students solve equations and inequalities involving absolute values.	
4.0 CAHSEE	Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x - 5) + 4(x - 2) = 12$.	
5.0 CAHSEE	Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	
6.0 CAHSEE	Students graph a linear equation and complete the x- and y- intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by the linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).	
7.0 CAHSEE	Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.	
8.0 CAHSEE	Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.	
9.0 CAHSEE	Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.	
10.0 CAHSEE	Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	
15.0 CAHSEE	Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	
17.0	Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.	
21.0	Students graph quadratic functions and know that their roots are the x-intercepts.	
23.0	Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	
24.2	Students identify the hypothesis and conclusion in logical deduction.	
24.3	Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	
25.1	Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	
25.2	Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step.	
25.3	Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether a statement is true sometimes, always or never.	