

COLORADO MODEL CONTENT STANDARDS FOR MATHEMATICS

Suggested Grade Level Expectations

Standard 1:

Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

1.1 Demonstrating meanings for whole numbers, commonly-used fractions and decimals (for example, $1/3$, $3/4$, 0.5 , 0.75), and representing equivalent forms of the same number through the use of physical models, drawings, calculators, and computers.

First grade students will:

- using objects and pictures, represent whole numbers from 0 to 100 in a variety of ways
- using objects, demonstrate the meanings of equal, less than, and greater than with the whole numbers 0 to 100
- apply equalities using the '=' symbol
- using concrete materials, demonstrate the meanings of halves, thirds, and fourths of sets and wholes
- demonstrate the value of nickels, dimes, quarters, and dollars in terms of pennies (*for example, 25 pennies = 1 quarter*)

1.2 Reading and writing whole numbers and knowing place-value concepts and numeration through their relationships to counting, ordering, and grouping.

First grade students will:

- read and write numerals from 0 to 100 in meaningful contexts
- read the number words for zero to ten
- group objects by ones and tens
- order according to place value (*for example, given 9 ones and 2 tens, the student can write the number 29; given the number 29 the student can show 2 tens and 9 ones*)
- write one- and two-digit whole numbers in expanded form (*for example, $29 = 20 + 9$*)

1.3 Using numbers to count, to measure, to label, and to indicate location.

First grade students will:

- count from 1 to 20 by 2's
- count from 1 to 100 by 1's, 5's, and 10's
- starting with any whole number less than 100, count forward to 100

- use ordinal positions for first through twentieth
- sequence selected whole numbers from 0 to 100

1.4 Developing, testing and explaining conjectures about properties of whole numbers, and commonly used fractions and decimals (for example, $1/3$, $3/4$, 0.5, 0.75).

First grade students will:

- know the commutative property of addition of whole numbers
- verify the addition and subtraction properties of zero with whole numbers

1.5 Using number sense to estimate and justify the reasonableness of solutions to problems involving whole numbers, and commonly used fractions and decimals (for example, $1/3$, $3/4$, 0.5, 0.75).

First grade students will:

- estimate a reasonable quantity for a given number of objects from 0 to 100

Standard 2:

Students use algebraic methods to explore, model and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.

2.1 Reproducing, extending, creating, and describing patterns and sequences using a variety of materials (for example, beans, toothpicks, pattern blocks, calculators, unifix cubes, colored tiles).

First grade students will:

- create and extend patterns using concrete materials (for example, uses pattern blocks to create a pattern and has another student extend the pattern)

2.2 Describing patterns and other relationships using tables, graphs, and open sentences.

First grade students will:

- continue the pattern given in a table of data using numbers and/or concrete materials

2.3 Recognizing when a pattern exists and using that information to solve a problem.

First grade students will:

- continue a pattern from a table and verbally describe the pattern

2.4 Observing and explaining how a change in one quantity can produce a change in another (for example, the relationship between the number of bicycles and the numbers of wheels).

First grade students will:

- using concrete or pictorial patterns, determine how the change in one variable affects the change in another (for example, how changing the number of bicycles changes the number of wheels)

Standard 3:

Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning and processes used in solving these problems.

3.1 Constructing, reading, and interpreting displays of data including tables, charts, pictographs, and bar graphs.

First grade students will:

- gather data about recurring and quantifiable events (for example, daily temperature or attendance)
- display and explain data from a bar graph or tallies

3.2 Interpreting data using the concepts of largest, smallest, most often, and middle.

First grade students will:

- using a bar graph, interpret data for "more" and "fewer" or "most," "same," and "fewest"

3.3 Generating, analyzing, and making predictions based on data obtained from surveys and chance devices.

First grade students will:

- use survey data to make a prediction displayed on a bar graph
- spin a spinner such as to generate and record results
- analyze the results from flipping a two-colored counter or coin

3.4 Solving problems using various strategies for making combinations (for example, determining the number of different outfits that can be made using two blouses and three skirts).

First grade students will:

- determine the number of outcomes when flipping a coin
- using manipulatives or pictures, determine the possible combinations of matching a set containing one element with a set containing two elements

Standard 4:

Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.

4.1 Recognizing shapes and their relationships (for example, symmetry and congruence) using a variety of materials (for example, pasta, boxes, pattern blocks).

First grade students will:

- recognize two-dimensional congruent figures in different positions

- create simple designs using concrete materials such as tangrams and pattern blocks

4.2 Identifying, describing, drawing, comparing, classifying, and building physical models of geometric figures.

First grade students will:

- describe the number of sides in triangles and in quadrilaterals such as squares and rectangles
- draw triangles, squares, rectangles, and circles

4.3 Relating geometric ideas to measurement and number sense.

First grade students will:

- measure the lengths of the sides of triangles, squares, rectangles to the nearest inch and centimeter

4.4 Solving problems using geometric relationships and spatial reasoning (for example, using rectangular coordinates to locate objects, constructing models of three-dimensional objects).

First grade students will:

- draw a picture or diagram to solve a problem (for example, use a circle to create a clock face; fold a rectangle to show one half)
- manipulate pattern blocks to form a variety of geometric shapes

Standard 5:

Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

5.1 Knowing, using, describing, and estimating measures of length, perimeter, capacity, weight, time, and temperature; and

5.3 Demonstrating the process of measuring and explaining the concepts related to units of measurement.

First grade students will:

- tell time to the nearest hour and half-hour, using an analog and digital clock
- name the days of the week in order
- estimate and measures the length of objects to the nearest inch, foot and centimeter
- estimate and measure the capacity of a container in cups
- estimate and weigh an object on a balance with a non-standard unit
- measure temperature to the nearest 10

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- describe the units for measuring time, length, capacity, and temperature
- tell the number of minutes in an hour, days in a week, pennies in a nickel, dime, quarter, and dollar

5.2 Comparing and ordering objects according to measurable attributes (for example, longest to shortest, lightest to heaviest).

First grade students will:

- compare objects according to the measurable attributes of length, capacity, weight, and temperature
- order objects according to the measurable attributes of length, capacity, weight, and temperature
- compare and order various times

5.4 Using the approximate measures of familiar objects (for example, the width of your finger, the temperature of a room, the weight of a gallon of milk) to develop a sense of measurement.

First grade students will:

- use familiar objects as referents for measurement (for example, the length of the student's index finger is about two paper clips)

5.5 Selecting and using appropriate standard and non-standard units of measurement in problem-solving situations.

First grade students will:

- select the appropriate units of measurement of time, length, capacity, and temperature

Standard 6:

Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

6.1 Demonstrating conceptual meanings for the four basic arithmetic operations of addition, subtraction, multiplication, and division.

First grade students will:

- demonstrate the operations of addition and subtraction of whole numbers with concrete materials
- link the operations of addition and subtraction, and equality with mathematical terms (for example, add, subtract and equal) and mathematical symbols (for example, +, -, =)

6.2 Adding and subtracting commonly used fractions and decimals using physical models (for example, $1/3$, $3/4$, 0.5, 0.75).

First grade students will:

- using concrete materials or pictures, add and subtract halves and fourths

6.3 Demonstrating understanding of and proficiency with basic addition, subtraction, multiplication, and division facts without the use of a calculator.

First grade students will:

- demonstrate understanding of basic addition sums to 20 and subtraction differences of 10

6.4 Constructing, using, and explaining procedures to compute and estimate with whole numbers.

First grade students will:

- demonstrate the operations of addition and subtraction of whole numbers with concrete materials
- link the operations of addition and subtraction, and equality with mathematical terms (for example, add, subtract and equal) and mathematical symbols (for example, +, −, =)
- using paper-and-pencil, demonstrate simple single-digit addition and subtraction

6.5 Selecting and using appropriate methods for computing with whole numbers in problem-solving situations from among mental arithmetic, estimation, paper-and-pencil, calculator and computer methods

First grade students will:

- given a real-world problem-solving situation, use the correct operation (addition or subtraction with concrete materials) and appropriate method (mental arithmetic, estimation, paper-and-pencil, calculator, or computer) to solve the problem

References

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