

Multiply whole numbers fluently up to 3 digits by 2 digits and divide numbers up to 4 digits by 1 digit and by 10 to solve problems.

Place value of large numbers:

- Read and write numbers to 1,000,000; relate them to the quantities they represent; compare and order.
- Compose and decompose numbers using place value to 1,000,000s, e.g., 25,068 is 2 ten thousands, 5 thousands, 0 hundreds, 6 tens, and 8 ones.
- Understand the magnitude of numbers up to 1,000,000; recognize the place values of numbers, and the relationship of each place value to the place to its right, e.g., 1,000 is 10 hundreds.

Multiples and factors:

- List the first ten multiples of a given one-digit whole number; determine if a whole number is a multiple of a given one-digit whole number.
- Find all factors of any whole number through 50, list factor pairs, and determine if a one-digit number is a factor of a given whole number.
- Know that some numbers including 2, 3, 5, 7, and 11 have exactly two factors (1 and the number itself) and are called prime numbers.
- Use factors and multiples to compose and decompose whole numbers.

Multiplication and division (also see 2nd and 3rd grade content expectations)

- Multiply two-digit numbers by 2, 3, 4, and 5, using the distributive property, e.g., $21 \times 3 = (1 + 20) \times 3 = (1 \times 3) + (20 \times 3) = 3 + 60 = 63$.
- Multiply fluently any whole number by a one-digit number, and a three-digit number by a two-digit number; for a two-digit by one-digit multiplication, use distributive property to develop meaning for the algorithm.
- Find the value of the unknowns in equations such as $a \div 10 = 25$; $125 \div b = 25$.
- Use the relationship between multiplication and division to simplify computations and check results.
- Solve contextual problems involving whole number multiplication and division.
- Estimate the answers to calculations involving addition, subtraction, or multiplication.
- Know when approximation is appropriate and use it to check the reasonableness of answers; be familiar with common place-value errors in calculations.
- Make appropriate estimations and calculations fluently with whole numbers using mental math strategies.

Solve contextual problems involving adding and subtracting fractions where one denominator is a multiple of the other.

See the content expectations for fractions in 2nd and 3rd grades.

- Understand fractions as parts of a set of objects.
- Explain why equivalent fractions are equal, using models such as fraction strips, or the number line, for fractions with denominators of 12 or less, or equal to 100.
- Locate fractions with denominators of 12 or less on the number line; include mixed numbers.
- Understand the relationships among halves, fourths and eighths and among thirds, sixths and twelfths.
- Know that fractions of the form m/n where m is greater than n , are greater than 1 and are called improper fractions; locate improper fractions on the number line.
- Write improper fractions as mixed numbers, and understand that a mixed number represents the number of “wholes” and the part of a whole remaining, e.g., $5/4 = 1 + 1/4 = 1 \frac{1}{4}$.
- Compare and order up to three fractions with denominators 2, 4, and 8, and 3, 6, and 12, including improper fractions and mixed numbers.
- Add and subtract fractions less than 1 with denominators through 12 and/or 100, in cases where the denominators are equal or when one denominator is a multiple of the other, e.g., $1/12 + 5/12 = 6/12$; $1/6 + 5/12 = 7/12$; $3/10 - 23/100 = 7/100$.

- Solve contextual problems involving sums and differences for fractions where one denominator is a multiple of the other (denominators 2 through 12, and 100).
- Find the value of an unknown in equations such as $1/8 + x = 5/8$ or $3/4 - y = 1/2$.
- Multiply fractions by whole numbers, using repeated addition and area or array models.

Add and subtract decimals through hundredths.

- Read and interpret decimals up to two decimal places; relate to money and place value decomposition.
- Know that terminating decimals represents fractions whose denominators are 10, 10x10, 10x10x10, etc., e.g., powers of 10.
- Locate tenths and hundredths on a number line.
- Read, write, interpret, and compare decimals up to two decimal places.
- Write tenths and hundredths in decimal and fraction forms, and know the decimal equivalents for halves and fourths.
- For problems that use addition and subtraction of decimals through hundredths, represent with mathematical statements and solve.
- Add and subtract decimals through hundredths.
- Multiply and divide decimals up to two decimal places by a one-digit whole number where the result is a terminating decimal.

Understand and solve problems involving perimeter, area and surface area of basic geometric shapes.

See the 2nd and 3rd grade content expectations about perimeter and area.

- Measure surface area of cubes and rectangular prisms by covering and counting area of the faces.
- Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.
- Find one dimension of a rectangle given the other dimension and its perimeter or area.
- Find the side of a square given its perimeter or area.
- Solve contextual problems about perimeter and area of squares and rectangles in compound shapes.
- Solve contextual problems about surface area.

Recognize plane figures that have line symmetry and sketch flips, slides and turns of two-dimensional figures.

- Identify and draw perpendicular, parallel, and intersecting lines using a ruler and a tool or object with a square (90°) corner.
- Identify right angles and compare angles to right angles.
- Identify basic geometric shapes including isosceles, equilateral and right triangles, and use their properties to solve problems.
- Identify and count the faces, edges, and vertices of basic three-dimensional geometric solids including cubes, rectangular prisms, and pyramids; describe the shape of their faces.

Use bar graphs and find the median and range of a set of data.

- Construct tables and bar graphs from given data.
- Order a given set of data, find the median, and specify the range of values.
- Solve problems using data presented in tables and bar graphs, e.g., compare data represented in two bar graphs and read bar graphs showing two data sets.

Also in 4th grade:

- Add and subtract whole numbers fluently; estimate the answers to calculations involving addition, subtraction, or multiplication; calculate fluently with whole numbers using mental math strategies; know when approximation is appropriate and use it to check the reasonableness of answers; be familiar with common place-value errors in calculations. Students are supposed to be fluent with multi-digit addition

and subtraction in 3rd grade, where it is a power standard. This extends and solidifies their proficiency. They also have practice with multi-digit addition when they do multi-digit multiplication, and when they calculate perimeters.

- Use common measuring tools; also measure temperatures both above and below zero – these skills are used extensively in science classes.
- Carry out the following conversions from one unit of measure to a larger or smaller unit of measure: meters to centimeters, kilograms to grams, liters to milliliters, hours to minutes, minutes to seconds, years to months, weeks to days, feet to inches, ounces to pounds (using numbers that involve only simple calculations). This is part of the 5th grade power standard for measurement.