

Illustrate the understanding of numbers across grade levels

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics. In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes. Kindergarten is the time when students are first introduced to numbers instructionally and need to understand the basic knowledge of numbers. First grade is starting to learn strategies.

In second grade, students will extend their understanding of place value to the hundreds place. They will use this place value understanding to solve word problems, including those involving length and other units of measure. Students will continue to work on their addition and subtraction skills, quickly and accurately adding and subtracting numbers up through 20 and also working with numbers up through 100. They will also build a foundation for understanding fractions by working with shapes and geometry.

In third grade students will continue to build their concept of numbers, developing an understanding of fractions as numbers. They will learn the concepts behind multiplication and division and apply problem-solving skills and strategies for multiplying and dividing numbers up through 100 to solve word problems. Students will also make connections between the concept of the area of a rectangle and multiplication and addition of whole numbers.

In fourth grade, students will use addition, subtraction, multiplication, and division to solve word problems involving measurement of volume, mass and time. Students will continue to build their understanding of fractions – create equal fractions, compare the size of fractions,

adding and subtracting fractions, and multiplying fractions by whole numbers. They will also start to understand the relationship between fractions and decimals.

In fifth grade, students will build their understanding of the place value system by working with decimals up to the hundredths place. Students will also add, subtract, and multiply fractions, including fractions with unlike denominators. They will continue to expand their geometry and measurement skills, learning the concept of volume and measuring the volume of a solid figure. Activities in these areas will include: quickly and accurately multiplying multi-digit whole numbers, dividing numbers with up to four digits by two digits, using exponents, comparing decimals to the thousandths place, adding, subtracting, multiplying, and dividing decimals to the hundredths place, writing and interpreting mathematical expressions using symbols like parentheses, adding and subtracting fractions with unlike denominators, multiplying and dividing fractions by whole numbers and other fractions, analyzing and determining relationships between numerical patterns and measuring volume using multiplication and addition.

In sixth grade, instructional time focuses on four critical areas: connection ratio and rate to whole number multiplication and division and using concepts of ratios and rate to solve problems, completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which include negative numbers, writing, interpreting, and using expressions and equations, and developing understanding of statistical thinking. Students use reasoning about multiplication and division to solve ratio and rate problems about quantities, use the meaning of fractions, multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions makes sense, Students will understand the use of variables in mathematical expressions. Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically.