



Critical Areas for COHERENCE in Mathematics in 6th Grade

In Grade 6, instructional time should focus on **five** critical areas:

1. Connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems.

Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

2. Completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers.

Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

3. Writing, interpreting, and using expressions and equations.

Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.

4. Developing an understanding of volume and surface area of prisms.

Building on the Grade 5 concept of packing unit cubes to find the volume of a rectangular prism with whole number edge lengths, students develop and apply a formula to find the volume of right rectangular prisms with fractional edge lengths. Students also represent three-dimensional figures with nets and use them to find surface area of prisms.

5. **Developing understanding of statistical thinking.**

Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. In Grade 6, two big statistical ideas are developed: measures of center and measures of variability. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. Students recognize that a measure of variability (range and interquartile range) can also be useful for summarizing data highlighting the spread of the data rather than just the center. Two very different sets of data can have the same mean and median yet be distinguished by their variability. This leads to an informal study of the impact of outliers. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, outliers, and symmetry, considering the context in which the data were collected.