

Building the Language of Mathematics for Students

Mathematically proficient students communicate precisely by engaging in discussions about their reasoning using appropriate mathematical language. The terms students should learn to use at each grade level with increasing precision are included in this document.

Mathematics can be thought of as a language that must be meaningful if students are to communicate mathematically and apply mathematics productively. Communication plays an important role in helping children construct links between their formal, intuitive notions and the abstract language and symbolism of mathematics; it also plays a key role in helping children make important connections among physical, pictorial, graphic, symbolic, verbal, and mental representations of mathematical ideas.

Curriculum and Evaluation Standards for School Mathematics, the National Council of Teachers of Mathematics (p. 26)

Mathematical vocabulary however should not be taught in isolation where it is meaningless and just becomes memorization. We know from research that meaningless memorization is not retained nor will it help build the deep understanding of the mathematical content. The students must be provided adequate opportunities to develop vocabulary in meaningful ways such as mathematical explorations and experiences. Students should be immersed into the mathematical language as they experience rich high-level tasks. As students communicate their thoughts, ideas, and justify the reasonableness of their solutions the mathematical language will begin to evolve. Students will then build the depth of understanding needed with mathematical vocabulary and content to empower them to be successful in mathematics.

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Third Grade

Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations-Fractions	Measurement and Data	Geometry
<p>Represent and solve problems involving multiplication and division. operations, multiplication, division, factor, product, quotient, partitioned equally, equal shares, number of groups, number in the groups, array, equation, unknown, expression</p> <p>Understand properties of multiplication and the relationship between multiplication and division. operation, multiply, divide, factor, product, quotient, dividend, divisor, strategies, unknown, (properties)-rules about how numbers work</p> <p>Multiply and divide within 100. operation, multiply, divide, factor, product, quotient, unknown, strategies, reasonableness, mental computation, property</p> <p>Solve problems involving the four operations, and identify and explain patterns in arithmetic. operation, multiply, divide, factor, product, quotient, subtract, add, addend, sum, difference, equation, expression, unknown, strategies, reasonableness, mental computation, estimation, rounding, patterns, (properties)-rules about how numbers work</p>	<p>Use place value understanding and properties of operations to perform multi-digit arithmetic. place value, round, addition, add, addend, sum, subtraction, subtract, difference, strategies, (properties)-rules about how numbers work</p>	<p>Develop understanding of fractions as numbers. partition(ed), equal parts, fraction, equal distance (intervals), equivalent, equivalence, reasonable, denominator, numerator, comparison, compare, $<$, $>$, $=$, justify, inequality</p>	<p>Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. estimate, time, time intervals, a.m, p.m, digital clock, analog clock, minute, hour, elapsed time, measure, liquid volume, mass, standard units, metric, gram (g), kilogram (kg), liter (L)</p> <p>Represent and interpret data. scale, scaled picture graph, scaled bar graph, line plot, data</p> <p>Geometric measurement: understand concepts of area and relate area to multiplication and to addition. attribute, area, square unit, plane figure, gap, overlap, square cm, square m, square in., square ft, nonstandard units, tiling, side length, decomposing</p> <p>Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. attribute, perimeter, plane figure, linear, area, polygon, side length</p>	<p>Reason with shapes and their attributes. attributes, properties, quadrilateral, open figure, closed figure, three-sided, 2-dimensional, 3-dimensional, rhombi, rectangles, and squares are subcategories of quadrilaterals, cubes, cones, cylinders, and rectangular prisms are subcategories of 3-dimensional figures shapes: polygon, rhombus/rhombi, rectangle, square, partition, unit fraction, kite, example and non-example</p> <p>From previous grades: triangle, quadrilateral, pentagon, hexagon, cube, trapezoid, half/quarter circle, circle, cone, cylinder, sphere</p>