

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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First Grade

Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
<p>Represent and solve problems involving addition and subtraction. add, adding to, taking from, putting together, comparing, unknown, sum, less than, equal to, minus, subtract, the same amount as, counting on, making ten, doubles, equation</p> <p>Understand and apply properties of operations and the relationship between addition and subtraction. add, subtract, unknown addend, order, first, second,</p> <p>Add and subtract within 20. addition, putting together, adding to, counting on, making ten, subtraction, taking apart, taking from, equivalent, sum, unknown, equal, equation, counting all, counting on, counting back</p> <p>Work with addition and subtraction equations. equation, equal, the same amount/quantity as, true, false, addition, putting together, adding to, counting on, making ten, subtract, taking apart, taking from, sum, unknown</p>	<p>Extend the counting sequence. number, zero, one, two...thirteen, fourteen...nineteen...one hundred twenty</p> <p>Understand place value. ones, tens, bundle, left-overs, singles, groups, compare, greater than, less than, equal to, <, >, =</p> <p>Use place value understanding and properties of operations to add and subtract. ones, tens, add, subtract, reason, more, less</p>	<p>Measure lengths indirectly and by iterating length units. compare, measure, order, length, height, more, less, longer than, shorter, than, first, second, third, gap, overlap, about, a little less than, a little more than</p> <p>Tell and write time. time, hour, half-hour, about, o'clock, past, analog clock, digital clock</p> <p>Represent and interpret data. Data, how many more, how many less, least, same, different, category, question, collect</p>	<p>Reason with shapes and their attributes. shape, closed, open, side, attribute, feature, two-dimensional, rectangle, square, trapezoid, triangle, half-circle, and quarter-circle, three-dimensional, rectangular prism cube, cone, prism, cylinder, partition, equal shares, halves, fourths, quarters, half of, fourth of, quarter of</p> <p>From previous grades: circle, rectangle, hexagon, sphere</p> <p>From previous grade: circle, hexagon, cube, cone, cylinder, sphere</p>

Second Grade

Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
<p>Represent and solve problems involving addition and subtraction. add, subtract, more, less, equal, equation, putting together, taking from, taking apart, addend, comparing, unknown</p> <p>Add and subtract within 20. add, subtract, sum, more, less, equal, equation, putting together, taking from, taking apart, addend</p> <p>Work with equal groups of objects to gain foundations for multiplication. odd, even, row, column, rectangular array, equal, addend, equation, sum</p>	<p>Understand place value. hundreds, tens, ones, skip count, base-ten, <i>number names to 1,000</i> (e.g., one, two, thirty, etc.), expanded form, greater than (>), less than (<), equal to (=), digit, compare</p> <p>Use place value understanding and properties of operations to add and subtract. fluent, compose, decompose, place value, digit, ten more, ten less, one hundred more, one hundred less, add, subtract, sum, equal, addition, subtraction</p>	<p>Measure and estimate lengths in standard units. about, a little less than, a little more than, longer, shorter, measure, standards units, units, customary, metric, inch, foot, centimeter, tools, ruler, meter, centimeter, ruler, yardstick, meter stick, measuring tape, estimate, sums, differences</p> <p>Relate addition and subtraction to length. inch, foot, yard, centimeter, meter, ruler, yardstick, meter stick, measuring tape, estimate, length, equation, number line, equally spaced, point, addition, subtraction, unknown, sums, differences, measure, standard units, customary, metric, units, sums, differences</p> <p>Work with time and money. time, hour hand, minute hand, hour, minute, a.m., p.m., o'clock, <i>multiples of 5</i> (e.g., five, ten, fifteen, etc.), analog clock, digital clock, quarter 'til, quarter after, half past, quarter hour, half hour, thirty minutes before, 30 minutes after, 30 minutes until, 30 minutes past, quarter, dime, nickel, dollar, cent(s), \$, ¢, heads, tails</p> <p>Represent and interpret data. collect, organize, display, show, data, attribute, sort, line plot, picture graph, bar graph, question, category, chart, table, most, least, more than, less than, about, same, different, measure, inch, foot, yard, centimeter, meter, length</p>	<p>Reason with shapes and their attributes. attribute, feature, angle, side, triangle, quadrilateral, square, rectangle, trapezoid, pentagon, hexagon, cube, face, edge, vertex, surface, figure, shape, closed, open, partition, equal size, equal shares, half, halves, thirds, half of, a third of, whole, two halves, three thirds, four fourths, rows, columns</p> <p>From previous grades: circle, square, sphere, half-circle, quarter-circle, cone, prism, cylinder, trapezoid</p>