

Section: Mathematics - Sixth Grade

Rationale: A practical and theoretical knowledge of mathematics should be an integral part of every child's education. Mathematics is a basic part of everyday living. Children must be given the opportunity to acquire the knowledge, mathematical skills and technological expertise necessary to prepare for their future in a 21st century workplace and or post-secondary education. The Columbia Public School District is responsible for ensuring that all students have the opportunity to acquire this mathematical foundation.

A mathematics program must maintain a balance of both practical and theoretical mathematical concepts and provide for individual differences. Instruction within the mathematics program should maintain a balanced development of conceptual understanding (CU), procedural fluency (PF), strategic competence (SC), adaptive reasoning (AR) and productive disposition (PD).

A mathematics program must include a variety of tools in order to meet the instructional needs of students. These may include textbooks, manipulatives, computers, and calculators as well as other technology. These tools should be readily available in reasonable numbers and complement the development of problem-solving skills and the understanding of mathematics. Materials should enhance a child's perspective of mathematics and assist teachers in measuring a student's understanding, strengths and deficiencies.

The measurement of a student's progress in a mathematics program is a continuous process that should utilize assessment information about the student from standardized tests at the national and state level as well as a variety of local measures. Through continuous interpretation and evaluation of all data a profile of the student's growth in the area of mathematics is created.

Teachers are the essential component of a successful mathematics program. It is essential that teachers have a positive attitude toward children as well as toward the teaching of mathematics. Teachers must attend and participate in in-service activities and encouraged to be actively involved in professional organizations, to attend professional meetings, to read professional literature and seek ways of improving their knowledge of mathematics and strategies of instruction. The Columbia School District shall provide in-service opportunities for teachers and administrators focusing on the teaching and learning of mathematics and current research.

It is critically important that Columbia Public Schools work with parents as partners in providing a successful experience in the study of mathematics. To this end, the district shall provide opportunities for parents to actively participate in their children's learning through various resources.

Course Description: The major focus for 6th grade mathematics is to develop an understanding and a capacity to be able to compute with positive rational numbers, e.g. rational fractions, and whole numbers. Students will extend their knowledge of algebraic thinking through the recognition of patterns and solving simple linear equations. They will continue to work in geometry to understand 2-dimensional properties including area and similarity of polygons. This is the first of three courses designed to prepare students for high school mathematics.

Strand I: Number and Algebra

Content A: Develop an understanding of and fluency with multiplication and division of fractions and decimals.

Learning Goal 1: Multiplication and division of fractions and decimals.

Measurable Learning Objective:

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
	SMS MA1 1.10 GLE N2C, N3C CU, PF Use standard algorithms or procedures (built on conceptual understanding) to multiply and divide fractions and decimals efficiently and accurately.		
	SMS MA5 1.10 GLE N1B6, N1B7 CU, PF, AR Demonstrate an understanding of the relationship between decimals and fractions, including the relationship between finite decimals (terminating decimals) and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to explain the procedures for multiplying and dividing decimals.		
	SMS MA1 3.1, 2 GLE N3C, N3E CU, PF Multiply and divide fractions and decimals to solve problems, including multi-step problems and problems involving measurement.		

Content B: Connect ratio and rate to multiplication and division

Learning Goal 1: Ratio, Rates and Percents

Learning Goal 2: Demonstrate flexibility with fractions, decimals, and percents

Measurable Learning Objective:

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
<p>PF Identify and write ratios as comparisons of part-to-part and part-to-whole relationships using appropriate notation.</p>			
	<p>CU, SC, AR Justify why the same ratio could be represented in different ways (e.g. two different pairs of numbers).</p>		
	<p>SMS MA1 3.2 GLE N3E CU, PF, AR Solve single- and multi-step contextual problems involving ratios and rates.</p>		
	<p>CU, PF Represent and model ratios associated with whole-number percents that are less than or equal to 100%.</p>		
	<p>SMS MA5 1.10 GLE N1B CU, PF Convert between the fractional, decimal, and percent representations of a number.</p>		

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
	SMS MA5 1.10 GLE N1A CU, PF, AR Compare ($<$, $>$, $=$) and order fractions, decimals, and percents efficiently and find their approximate locations on a number line.		

Content C: Write, interpret, and use mathematical expressions and equations

Learning Goal 1: Mathematical expressions and equations

Measurable Learning Objective:

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
	SMS MA4 3.3 GLE A2A PF Write mathematical expressions and equations that correspond to given situations, evaluate expressions for a given value, and use expressions and formulas to solve problems.		
	SMS M5 1.6 GLE N2D CU, PF Know (built on conceptual understanding) and be able to use the notation, language, and calculation of whole number exponents and roots.		
	CU Describe how variables can represent numbers whose exact values are not yet specified, and use variables appropriately.		

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
	SMS MA4 3.6 GLE A3A CU, PF Explain how expressions in different forms can be equivalent, and rewrite an expression to represent a quantity in a different way (e.g., to make it more compact or to feature different information).		
	CU, AR Know that the solutions of an equation are the values of the variables that make the equation true.		
	SMS MA4 3.3 GLE A2A CU, PF Solve simple one-step equations by using number sense, properties of operations, and the idea of maintaining equality on both sides of an equation.		
	SMS MA4 3.6 GLE A3A CU, PF Construct and analyze tables (e.g., to show quantities that are in equivalent ratios), and use equations to describe simple relationships (such as $3x = y$) shown in a table.		

Strand II: Geometry and Measurement

Content D: Extend student understanding of two-dimensional figures

Learning Goal 1: Represent, identify and classify geometric figures from written or verbal descriptions, measurements, and properties using sketches, figures represented on the coordinate plane, grids, or models.

Learning Goal 2: Develop and apply formulas for perimeter/circumference and area of quadrilaterals, circles, and composite figures made from these shapes.

Measurable Learning Objective:

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
SMS MA2 1.10 GLE G1A PF Identify and use the properties of two-dimensional shapes (including congruency, parallelism, perpendicularity, and symmetry) to classify quadrilaterals and triangles.			
	SMS MA2 1.10 GLE G2A, M1A CU, AR Draw or create two-dimensional figures or models with specified measures and properties.		
SMS MA2 3.2 GLE M2B7 PF Measure angles to the nearest degree.			
	SMS MA2 1.10 GLE M2C6 CU, AR Use the properties of two-dimensional shapes to determine the relationships between the areas of various quadrilaterals and how these relationships are expressed in the formulas for the figures.		

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
	PF Know and be able to use the formulas (built on conceptual understanding) for the circumference and area of circles.		
	PF Know and be able to use the formulas (built on conceptual understanding) for the perimeter and area of quadrilaterals and triangles.		
	SMS MA2 1.10 GLE M2C CU, PF, AR, SC Solve single- and multi-step contextual problems involving quadrilaterals and triangles (perimeter and area), circles (radius, diameter, circumference, and area), and composite figures made from these shapes.		

Strand III: Data Analysis and Probability

Content E: Design and conduct sample surveys, explore random selection, and compare data distributions.

Learning Goal 1: Formulate questions, identify the numerical attributes on which to collect data, begin work in understanding variability.

Measurable Learning Objective:

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
	SMS MA3 3.5 GLE D3A CU, AR Distinguish between a population and a sample, and identify methods of sample selection.		

Recall Level 1 (Basic Knowledge)	Application Level 2 (Skills)	Strategic Thinking Level 3 (Reasoning)	Extended Thinking Level 4 (Products/Performance)
			SMS MA3 1.2 GLE D1A AR Design and conduct sample surveys.
	SMS MA3 1.10 GLE D2A CU, PF, AR Describe and use measures of central tendency (mean, median, and mode), discuss when it is appropriate to use each, and how each is influenced by outliers.		
	SMS MA3 1.8 GLE D1C CU, PF, AR Use and be able to explain similarities and differences between different types of data displays in comparing sample survey results.		
	CU, AR Be able to explain similarities and differences between interpretations of the mean as the "fair share" value for data and as the "balancing point" of the corresponding data distribution.		