

Mathematics Curriculum

Sixth Grade

By the end of sixth grade students have mastered addition, subtraction, multiplication, and division using whole numbers, fractions and decimals. They have applied and adapted a variety of appropriate strategies to solve problems. They understand and compute percents. They are introduced to using formulas and equations. They know basic geometric terms and properties. They are introduced to algebraic concepts. They can analyze data using mean, median, mode and range. They understand and apply data collection, organization, representation, and vocabulary to communicate, reason and justify their real world solutions. They apply learned measurement skills/strategies to real world situations using both customary and metric units of measure.

Archdiocese of Santa Fe Standard 1:

Numbers and Operations:

Students understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand meanings of operations and how they relate to one another; and compute fluently and make reasonable estimates. NCTM

Critical for Mastery in Grade 6

LEARNING OUTCOMES (What students will be able to do, know, understand and value)	SAMPLE ASSESSMENTS/STRATEGIES (What evidence will demonstrate that students have achieved the Learning Outcome)	BEST PRACTICES
A. Number Sense: Understand numbers, ways of representing numbers, relationships among numbers, and number systems.		
1. Recognize place value of whole numbers and decimals.	<ul style="list-style-type: none"> • Create a place value chart. 	
2. Read and write numbers to trillions.	<ul style="list-style-type: none"> • Write a number in words; use the words to write a given number. 	
3. Round numbers to specific value with	<ul style="list-style-type: none"> • Round to a give place. 	

accuracy.		
4. Compare and order numbers (whole numbers, decimals, fractions, and integers).	<ul style="list-style-type: none"> List up to five numbers in order least to greatest or greatest to least using a number line. 	
5. Express numbers in scientific notation.	<ul style="list-style-type: none"> Express the distance from earth to the sun. 	
6. Recognize prime and composite numbers.	<ul style="list-style-type: none"> Create a prime number chart for numbers 1 to 50. 	
7. Compute using order of operations.	<ul style="list-style-type: none"> Use PEMDAS to remember the correct order of operations. 	
8. Evaluate exponents.	<ul style="list-style-type: none"> Find the value of “4 to the fifth power.” 	
9. Use number lines.	<ul style="list-style-type: none"> Draw a number line correctly with positive and negative numbers. 	
10. Use prime factorization.	<ul style="list-style-type: none"> Draw a factor tree. 	
B. Addition and Subtraction: Compute fluently and make reasonable estimates.		
1. Add and subtract whole numbers.	<ul style="list-style-type: none"> Add and subtract numbers in the millions. 	
2. Add and subtract integers.	<ul style="list-style-type: none"> Use number lines, money, algebra tiles, etc. to model addition and subtraction. 	
3. Make reasonable estimates of the sum and difference of whole numbers.	<ul style="list-style-type: none"> Use front end estimation and rounding to the same place value to estimate sums and differences. 	
C. Multiplication and Division: Compute fluently and make reasonable estimates.		
1. Use and apply the divisibility rules for 2,3,4,5,6,9,10.	<ul style="list-style-type: none"> Make a chart showing if a number is divisible by 2,3,4,5,6,9 and 10. 	
2. Find LCM and GCF.	<ul style="list-style-type: none"> Use a list to find the common factors or multiples. 	
3. Multiply whole numbers by 1 to 4-digit numbers.	<ul style="list-style-type: none"> Multiply using a traditional algorithm. 	

4. Divide whole numbers up to 6-digit numbers by 1 to 3-digit numbers. Express answers using remainders, fractions and decimals.	<ul style="list-style-type: none"> • Use short and long division algorithms. 	
5. Make reasonable estimates of the product and quotient of whole numbers.	<ul style="list-style-type: none"> • Use compatible numbers for dividing. 	
6. Multiply and divide integers.	<ul style="list-style-type: none"> • Use the rules for multiplying and dividing integers. 	
D. Properties: Understand and use the properties of addition and multiplication.		
1. Identify and use commutative, associative and identity properties of addition and multiplication.	<ul style="list-style-type: none"> • Identify the property used in a given example. 	
E. Decimals/Fractions/Ratios/Percents: Understand and use the properties of addition and multiplication.		
1. Add, subtract, multiply and divide decimals.	<ul style="list-style-type: none"> • Add and subtract when adding 0's is needed. • Multiply numbers with different place values. • Divide decimal numbers by whole numbers and decimal numbers. 	
2. Reduce fractions to lowest terms.	<ul style="list-style-type: none"> • Use a common factor to reduce a fraction to simplest form. 	
3. Find equivalent fractions.	<ul style="list-style-type: none"> • List three equivalent fractions for a given fraction. 	
4. Add and subtract fractions with like/unlike denominators.	<ul style="list-style-type: none"> • Find the sum or difference of two fractions. Write answer in simplest form. 	
5. Add and subtract mixed numbers with like/unlike denominators including regrouping.	<ul style="list-style-type: none"> • Use the measurements of ingredients in a recipe to find totals using addition and subtraction (e.g., 1-1/2 cup flour and 1-3/4 	

	cup sugar).	
6. Change improper fractions to mixed numbers and vice versa.	<ul style="list-style-type: none"> Change $4\frac{3}{5}$ to $\frac{23}{5}$. 	
7. Multiply and divide fractions and mixed numbers.	<ul style="list-style-type: none"> Multiply a series of three fractions. Cancel out common factors before multiplying. Find reciprocals before dividing. 	
8. Convert between fractions, decimals, and percents.	<ul style="list-style-type: none"> Complete a chart. 	
9. Recognize the relationship between the fractional part, the whole and the percent.	<ul style="list-style-type: none"> Draw a diagram to represent the part, the whole, and the percent. 	
10. Calculate the percent of a number.	<ul style="list-style-type: none"> Use decimals and fractions to calculate 20% of 45. 	
11. Express ratio in three forms.	<ul style="list-style-type: none"> E.g., 1 to 3; 1:3; and $\frac{1}{3}$. 	
12. Solve proportion problems.	<ul style="list-style-type: none"> Use proportions to find unknown quantities in scale factor, percent, rate, etc. problems. 	
13. Make reasonable estimates using fractions and decimals.	<ul style="list-style-type: none"> Round to the nearest whole number before computing. 	

Archdiocese of Santa Fe Standard 2:

Measurement:

Students understand measurable attributes of objects and the units, systems and processes of measurement; and apply the appropriate techniques, tools, and formulas to determine measurements. NCTM

Critical for Mastery in Grade 6

LEARNING OUTCOMES (What students will be able to do, know, understand and value)	SAMPLE ASSESSMENTS/STRATEGIES (What evidence will demonstrate that students have achieved the Learning Outcome)	BEST PRACTICES
A. Customary Units:		
1. Memorize the unit equivalence in the customary units in measuring length,	<ul style="list-style-type: none"> E.g., 1 foot = 12 inches, 1 gallon = 4 quarts, 1 pound = 16 ounces. 	

capacity, weight.		
2. Convert within the customary units in measuring length, capacity, weight.	<ul style="list-style-type: none"> Use multiplication to convert larger units to smaller units; division to convert smaller units to larger units. 	
3. Estimate and measure objects using appropriate units in the customary system.	<ul style="list-style-type: none"> Measure objects in the classroom to the nearest $\frac{1}{16}$ inch using rulers, yardsticks, or tape measure. 	
B. Metric System:		
1. Memorize the unit equivalence in the metric system (e.g., 1 km = 1000 m).	<ul style="list-style-type: none"> 1 Kilometer = 1000 meters, 1 Liter = 1000 milliliters, 1 gram = 100 milligrams. 	
2. Convert within the metric system in measuring length, capacity and weight.	<ul style="list-style-type: none"> Use a table of metric units to help convert from centimeters to meters by moving the decimal 2 places to the left. 	
3. Estimate and measure objects using appropriate units in metric system.	<ul style="list-style-type: none"> Measure objects in the classroom to the nearest millimeter using rulers, meter sticks, or tape measure. 	
C. Time: Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.		
1. Convert units of time.	<ul style="list-style-type: none"> 75 minutes = 1 hour 15 minutes. 	
2. Calculate elapsed time.	<ul style="list-style-type: none"> Find the elapsed time given the start and end time (e.g., 9:55 AM to 2:30 PM). 	

Archdiocese of Santa Fe Standard 3:

Algebra and Problem Solving:

Students understand patterns, relations, and functions; represent and analyze mathematical situations and structures using algebraic symbols; use mathematical models to represent and understand quantitative relationships; analyze change in various contexts; and apply and adapt a variety of appropriate strategies to solve problems. NCTM

Critical for Mastery in Grade 6

LEARNING OUTCOMES (What students will be able to do, know, understand and value)	SAMPLE ASSESSMENTS/STRATEGIES (What evidence will demonstrate that students have achieved the Learning Outcome)	BEST PRACTICES
A. Variables and Expressions: Represent and analyze mathematical situations and structures using algebraic symbols.		
1. Recognize variables, constants, and expressions.	<ul style="list-style-type: none"> • Name the variables and constants in a given expression. 	
2. Recognize mathematical symbols for various operations.	<ul style="list-style-type: none"> • Use parentheses and multiplication dot. 	
3. Translate phrases into mathematical expressions.	<ul style="list-style-type: none"> • E.g., “The sum of a number and four” becomes “$x+4$”. 	
4. Evaluate simple expressions applying the correct order of operations.	<ul style="list-style-type: none"> • E.g., Evaluate $5x - 3y$ when $x = 4$ and $y = 1$. 	
B. Equations: Use mathematical models to represent and understand quantitative relationships.		
1. Translate sentences into mathematical equations.	<ul style="list-style-type: none"> • E.g., “The product of five and a number is 20” becomes “$5z = 20$.” 	
2. Solve one-step equations using inverse operations.	<ul style="list-style-type: none"> • Add 5 to both sides of the equation $y - 5 = 11$ to solve for y. 	
C. Inequalities: Represent and analyze mathematical situations and structures using algebraic symbols.		
1. Identify the inequality symbols used.	<ul style="list-style-type: none"> • Read “is greater than,” “is less than,” or “is not equal to” for the appropriate symbol. 	
2. Translate sentences into mathematical inequalities.	<ul style="list-style-type: none"> • Use “at most” and “at least” to create inequalities. 	
3. Solve one step inequalities.	<ul style="list-style-type: none"> • Find the values that make a given inequality 	

	true.	
D. Patterns, Sequences and Functions: Understand change in various contexts.		
1. Describe the pattern of a series of numbers or pictures.	<ul style="list-style-type: none"> Recognize repeated addition or subtraction in a given series of numbers. 	
2. Find the next term(s) in a series of numbers or pictures.	<ul style="list-style-type: none"> Predict the next three terms in a series. 	
3. Identify input and output.	<ul style="list-style-type: none"> Use a table. List inputs and outputs for $y = x + 3$ if $x = 0, 1, 2$ and 3. 	

Archdiocese of Santa Fe Standard 4:

Geometry:

Students analyze characteristics and properties of two-and-three dimensional geometric shapes and develop mathematical arguments about geometric relationships; specify locations and describe spatial relationships using coordinate geometry and other representational systems; apply transformations and use symmetry to analyze mathematical situations; and use visualization, spatial reasoning, and geometric modeling to solve problems. NCTM

Critical for Mastery in Grade 6

LEARNING OUTCOMES (What students will be able to do, know, understand and value)	SAMPLE ASSESSMENTS/STRATEGIES (What evidence will demonstrate that students have achieved the Learning Outcome)	BEST PRACTICES
A. Geometric Terms: Specify locations and describe spatial relationships using coordinate geometry and other representational systems.		
1. Identify and name points, segments, lines, rays, angles and planes.	<ul style="list-style-type: none"> Use the proper symbols to name an angle. 	
2. Identify and name the polygons.	<ul style="list-style-type: none"> Cut out shapes from paper with three to ten sides. Name the polygon that is created. 	

3. Identify the parts of the coordinates plane and plot ordered pairs.	<ul style="list-style-type: none"> • Draw a coordinate plane on graph paper. Label the axis, origin and quadrants. Plot at least four ordered pairs. 	
4. Identify the parts of a circle.	<ul style="list-style-type: none"> • Use a clock face and hands to illustrate radius, diameter, circumference, and arcs. 	
5. Recognize vertices, edges and faces.	<ul style="list-style-type: none"> • Use classroom objects (books, boxes, pyramids, cans) to count faces, edges and vertices. 	
B. Identify and Classify Shapes: Analyze characteristics and properties of 2-D and 3-D shapes and develop mathematical arguments.		
1. Classify angles, triangles and quadrilaterals.	<ul style="list-style-type: none"> • Measure angles and then classify them as acute, right or obtuse. Classify triangles by sides and angles. Classify parallelograms, rectangles, squares, rhombus, and trapezoids using a flow chart. 	
2. Classify three dimensional figures.	<ul style="list-style-type: none"> • Use classroom objects to identify prisms, pyramids, cylinders, cones and spheres. 	
3. Draw 2 and 3 dimensional figures.	<ul style="list-style-type: none"> • Make sketches of figures. 	
4. Draw with a compass, straightedge, and protractor.	<ul style="list-style-type: none"> • Use a compass to draw a circle. Draw an angle using a protractor. 	
5. Identify supplementary and complementary angles.	<ul style="list-style-type: none"> • Find the complement and supplement of a 53° angle. 	
6. Identify similar and congruent figures.	<ul style="list-style-type: none"> • List corresponding parts of two similar figures. 	
7. Identify line and rotational symmetry.	<ul style="list-style-type: none"> • Use letters of the alphabet to determine the number of lines of symmetry. 	
C. Geometric Formulas: Use visualization, spatial reasoning, and geometric modeling to solve problems.		
1. Find the perimeter of polygons.	<ul style="list-style-type: none"> • Draw a polygon on grid paper and compute 	

	its perimeter.	
2. Find the area of squares, rectangles, parallelograms, trapezoids and triangles.	<ul style="list-style-type: none"> Use formulas to compute area. Express answer in square units. 	
3. Find the circumference and area of circles.	<ul style="list-style-type: none"> Use formulas to compute area and perimeter. Use $\pi = 3.14$ and $\pi = \frac{22}{7}$. 	
4. Find the volume of rectangular prisms.	<ul style="list-style-type: none"> Use the formula to compute volume. Express answer in cubic units. 	
5. Know that the sum of the measures of the angles of a triangle is equal to 180° .	<ul style="list-style-type: none"> Find the unknown angle measure given the measure of the other two angles. 	

Archdiocese of Santa Fe Standard 5:

Data Analysis, Statistics and Probability:

Students formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them; select and use appropriate statistical methods to analyze data; develop and evaluate inferences and predictions based on data; and understand and apply basic concepts of probability. NCTM

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LEARNING OUTCOMES (What students will be able to do, know, understand and value)	SAMPLE ASSESSMENTS/STRATEGIES (What evidence will demonstrate that students have achieved the Learning Outcome)	BEST PRACTICES
A. Statistics: Select and use appropriate statistical methods to analyze data.		
1. Find mean, median, mode and range of up to ten numbers.	<ul style="list-style-type: none"> Record the outside temperature every day for two weeks and find the mean, median, mode and range. 	
2. Use measures of central tendency to interpret data.	<ul style="list-style-type: none"> Explain which value (from above situation) best describes the data in the situation mentioned above. 	
3. Collect and use data to create an	<ul style="list-style-type: none"> Use the data from the previous situation to 	

appropriate data display.	construct a graph.	
4. Recognize different types of graphs.	<ul style="list-style-type: none"> Name the type of graph in a given display. 	
5. Construct frequency tables, line graphs and bar graphs.	<ul style="list-style-type: none"> Draw a line graph and a bar graph from the same set of data. Use reasonable interval and label units. 	
6. Sketch circle graphs.	<ul style="list-style-type: none"> Use a budget to sketch a circle graph. Develop the graph using a computer program. 	
B. Probability: Understand and apply basic concepts of probability.		
1. Identify outcomes, events and experiments.	<ul style="list-style-type: none"> Use a coin toss or roll a number cube to demonstrate, outcomes and events. 	
2. List possible outcomes of events.	<ul style="list-style-type: none"> List the outcomes when tossing a number cube. 	
3. Determine the probability of simple events.	<ul style="list-style-type: none"> Determine the probability of an outcome when spinning a spinner. 	
4. Express probabilities in fractions, decimals or percents.	<ul style="list-style-type: none"> Express probability as a number between 0 and 1. 	
5. Make predictions using probability.	<ul style="list-style-type: none"> Predict how likely an event is to happen. 	
6. Compare theoretical probability to the actual outcome of an experiment.	<ul style="list-style-type: none"> Flip a coin 20 times and count the number of tails. Compare results to the expected number. 	
C. Data Analysis: Develop and evaluate inferences and predictions that are based on data.		
1. Read information from a variety of graphs.	<ul style="list-style-type: none"> Find information using a graph found in the newspaper. 	
2. Draw conclusions from data on graphs.	<ul style="list-style-type: none"> Write a paragraph about the information contained in a published graph. 	
3. Make predictions from data on graphs.	<ul style="list-style-type: none"> Using a circle graph on favorite types of drink for 100 people surveyed, predict how 	

	many out of 300 will choose a particular type of drink.	
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Archdiocese of Santa Fe Standard 6:

Mathematical Processes:

With opportunities integrated throughout the curriculum, students develop mathematical practices and processes such as solving problems, making connections, understanding multiple representations of mathematical ideas, communicating their thought processes, and justifying their reasoning appropriate to grade level. NCTM

Mathematical Processes and Practices:	Teacher Notes:
1. Students make sense of problems and persevere in solving them.	
2. Students select and use various types of reasoning and methods of proof.	
3. Students construct viable arguments and critique the reasoning of others.	
4. Students evaluate the reasonableness of predictions, estimations and solutions.	
5. Students use a variety of tools and strategies in problem solving.	
6. Students attend to accuracy and precision and proof their work.	
7. Students use a variety of mathematical representations to organize, record and communicate mathematical ideas.	
8. Students apply mathematical knowledge and skills routinely in other content areas and practical situations.	