Mathematics Curriculum

First Grade

By the end of first grade students are developing strategies to add and subtract facts 0-18. They understand place value of tens and ones up to 100. Students can use numbers to write, count, compare, and represent quantities to 120. They can represent problems with manipulatives and are developing problem-solving strategies for simple addition and subtraction stories. They understand simple terms to measure and compare objects. They are developing a foundation to understand money, time, length, and the calendar. Students can identify shapes, as well as sort and compare shapes according to a given attribute. They can collect and represent data in simple graphs.

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 1

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: **Develop understanding of whole number relationships, including grouping in tens and ones.**		
1. Count to 120 by ones, twos, fives and tens.	• Have students count out a given number of links (e.g., show 30 links by counting by 2 links at a time).	
2. Count to 120 starting at any number.	• Use a number line.	
3. Count backwards from 100 starting at any number.	• Use a number line.	
4. Read/Model/Write numbers 0 - 100 in and out of order.	• Play Bingo. • Hundred Chart activities.	
5. Represent a whole number using	• Match a picture of a set to a given number.	

manipulatives/pictures from 0 – 100.		
6. Identify odd and even numbers to 100.	• Use unifix cubes to show whether a given number is odd or even.	
7. Compare two whole numbers through 100 using equality and inequality symbols.	• Use "alligator mouth" analogy to compare two numbers and show that the alligator always faces and eats the greatest number.	
8. Order three or more whole numbers through 100 (least – greatest, greatest – least).	• Put the following numbers in order from least to greatest: 25 15 40.	
9. Identify place value of 1s, 10s and 100s.	• Use base ten blocks to represent a given number.	
10. Write a two digit number in expanded form to show place value.	• $53 = 50+3$	
11. Use ordinal numbers to show position (1st to 20th).	• Have students stand in line and identify their place using correct ordinal number.	
12. Estimate the number of objects in a set up to 100.	• Estimation jar.	
13. Round numbers to nearest 10 up to 100.	• Use a number line.	
B. Addition and Subtraction: **Develop understanding of addition and subtraction and strategies for basic addition and related subtraction facts.**		

1. Use strategies to learn addition and subtraction facts:
    a. Doubles
    b. Doubles plus one
    c. One more
    d. Identity property
    e. Fact families
    f. Making ten
	a) Label and solve doubles facts: $4+4 = 8$; $6+6 = 12$.
	 b) If I know that $4+4 = 8$, that helps me know that $4+5$ is one more or 9.
	 c) $6+1 = 7$ because 7 is one more than 6.
	 d) $5+0 = 5$
	 e) Associate related numbers to quickly solve related addition and subtraction problems: $2+3=5$; $3+2=5$; $5-3=2$; $5-2=3$
	 f) $9 + 1 + 6 = (9 + 1) + 6 = 16$	

2. Develop fluency in adding and subtracting through 18.	• Use manipulatives (e.g., unifix cubes and number wraps).	
3. Write fact families (addition and	• $9+8=17$; $8+9=17$; $17-9=8$; $17-8=9$	

subtraction) through 18.	• Using links of different colors, have students make two groups. Then add the groups. Switch the groups to show that it doesn't matter in which order they are added. Do the same with subtraction.	

4. Recognize and use the terms:
    a. Add, addend, sum
    b. Subtract, difference
	• Match word to symbol or corresponding word problem.	

5. Find the sum of three one-digit numbers.	• 6+7+5 = 18	
6. Add and subtract two digit numbers without regrouping.	• 24+71 = 95	
7. Select appropriate operation to solve word problems and write corresponding addition/subtraction number sentence.	• Act out situations with manipulatives/drawings and have students identify the story as "some, some more;" "join together;" "some, some went away;" or "take away."	
C. Multiplication and Division:		
No objectives		
D. Properties: Use properties of addition to add whole numbers.		
1. Use the commutative and associative properties to add single-digit whole numbers.	• Students can demonstrate with objects that 4+1 is the same amount as 1+4 (commutative property). • Students can demonstrate with objects that (2+3)+5 is the same amount as 2+(3+5) (associative property).	
E. Decimals/Fractions/Ratios/Percents: Begin to understand and represent commonly used fractions.		
1. Recognize that fractions represent equal size parts of a whole or part of a set of objects.	• Divide an object or picture into equal parts and write corresponding fraction.	
2. Identify in words and symbols a model or diagram that is divided into equal parts (halves, thirds, fourths, eighths, and tenths).	• Match fraction to picture.	

3. Make model or diagram to represent given fractions (halves, thirds, fourths, eighths, and tenths).	• Using a Hershey bar, have students divide the bar according to given fraction.	

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

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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. Linear: **Recognize and compare the measurable attributes of length.**		
1. Estimate and measure length, width, and height using non-standard and standard units (i.e., inches, centimeters, and feet).	• Students estimate how many child-size foot steps it takes to cross the classroom. Check prediction. Measure using foot long rulers and compare.	
2. Compare and order lengths.	• Arrange five students in order according to height.	
B. Weight: **Recognize and compare the measurable attributes of weight.**		
1. Estimate and weigh objects using balance scale.	• Given two objects, students will predict which object is heavier. Confirm prediction with balance scale.	
2. Compare and order weights.	• Give students ten small rocks. Choose one as the standard rock. Have students compare the weight of the other rocks to the first and arrange the rocks in order from lightest to heaviest.	

3. Select appropriate tool for measuring weight.	• Given a picture of a scale, ruler, or thermometer, student chooses the scale as the tool used to find the weight of an object.	
C. Temperature: **Recognize and compare the measurable attributes of temperature.**		
1. Use thermometer with a Fahrenheit scale to measure temperature to the nearest ten degrees.	• "Student of the Day" checks and records the daily outside temperature.	
D. Time: **Recognize and compare the measurable attributes of time.**		
1. Read and identify dates and days of week using a calendar.	• Daily Math Meeting Activity.	
2. Name the days of the week for yesterday, today, and tomorrow.	• Play "Name the Day." Today is Wednesday. What day was yesterday?	
3. Recite the 12 months of the year.	• Daily Math Meeting Activity.	
4. Order a sequence of events with respect to time (e.g., season, month, day, morning, afternoon, evening).	• Relate daily school activities to the time of day (e.g., time for prayer, time for gym, time for lunch, etc.) and put in sequential order.	
5. Use digital and analog clocks to tell time to the hour and half hour.	• Show time to the nearest hour and half hour (using a "Judy clock") as to when school starts, lunch, and dismissal.	
E. Money: **Recognize and compare the measureable attributes of money.**		
1. Identify and state value of penny, nickel, dime, quarter, and dollar.	• Match a picture of each coin or dollar to its corresponding value.	
2. Determine the value of mixed coins (e.g., pennies, nickels, and dimes) up to total value of one dollar.	• Given a group of dimes, nickels, and/or pennies, students can count, add on, and give the total amount.	
3. Show different combinations of coins that have the same value.	• Students can show 10 pennies is the same as 2 nickels or 1 dime.	
4. Write money amounts with $ and ¢ symbols.	• Using Smart Board students are asked to write a $ or ¢ symbol based on teacher	

	direction.	
F. Capacity: **Recognize and compare the measureable** **attributes of capacity.**		
1. Estimate and measure capacity of objects using non-standard units.	• Estimate to record how many jelly beans it would take to fill a glass jar. Verify the results of the estimate. Students can tell if the estimate was less than or greater than actual number.	

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

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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. Variables and Expressions: **Use algebraic notation to represent and analyze situations and structures.**		
1. Solve open number sentences that have variables representing numbers up to 10.	• $10 = \_\_\_ + 2$	
B. Equation: 1. See Number Sense (B7)		
C. Inequality: 1. See Number Sense (A7)		
D. Patterns and Sequences: **Identify, duplicate, and extend patterns and sequences.**		

1. Use concrete objects and pictures to create patterns and describe them in a variety of ways.	• Given different patterns using pattern blocks, students must describe the pattern they see (e.g., ABBABB).	
2. Sort, classify and order objects by two or more attributes, such as color and shape, and explain how objects were sorted.	• Given a box of buttons students are able to sort by shape and color, shape and number of holes, etc.	
3. Extend a given pattern of sounds, shapes or simple numbers. Create and record similar patterns.	• Daily Math Meeting Activity.	
4. Use number pairs to describe another number.	• Another way to express 10 is 2+8 or 5+5.	
E. Functions:		
No objectives		

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 1

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: **Identify, name and describe a variety of geometric terms.**		
1. Use geometric terms to identify, label, and describe geometric shapes, solids, structures, and relationships.	• Students understand and correctly apply terms such as square, triangle, rectangle, circle, cube, sphere, pyramid, cylinder, cone, smaller, smallest, longer, longest,	

	larger, largest, below, above, side, right, left, outside, inside, behind, beside, corner, middle, between, front, and back.	
B. Identify and Classify Shapes: **Identify, classify and draw a variety of geometric shapes.**		
1. Compare similarities and differences between common geometric shapes.	• Students can sort shapes according to number of sides, angles, faces, etc.	
2. Compose (combine) and decompose (take apart) basic shapes.	• Put two triangles together to make a rhombus.	
3. Locate coordinate points on a grid using directional words (right 2, up 1).	• Given number pair (2,1) student can move right 2 spaces and up 1 space to locate point on numbered grid.	
4. Copy figures and draw simple two-dimensional shapes from memory.	• Draw triangle, circle, square, and rectangle without a model.	
C. Geometric Formulas:		
No objectives		

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:		
No objectives		
B. Probability: **Understand and apply basic concepts of probability.**		

1. Predict the likelihood of an event using terms such as possible, impossible, more/less likely when using spinners, dice, number cubes, etc.	• Using spinners, students will predict the number that the spinner will most likely land on for 10 spins. Extend to predicting which number would be less likely or impossible for the spinner to land on.	
2. Compare the outcome of a probability experiment to prediction.	• Record and organize (e.g., sort, sequence, and tally) data from the probability experiment in order to determine the outcome. Tell whether outcome was more, less, or equal to prediction.	
3. Compare results of two repetitions of the same probability experiment.	• Repeat spinner experiment to determine if outcome will be the same. Tell whether second outcome was more, less, or equal to first outcome.	
C. Data Analysis: **Sort and classify objects; represent data using concrete objects, pictures and graphs and read, interpret and make comparisons from the data presented.**		
1. Identify multiple categories for sorting data.	• Students list four flavors of ice cream to determine which flavor is the class favorite.	
2. Collect and organize data into charts using tally marks.	• Survey students and record responses using tally marks.	
3. Represent data using objects, pictures, tables, pictographs, and bar graphs using a scale of 1.	• Using class bar graph student can place the next length to extend the appropriate bar.	
4. Read, interpret, and make comparisons from data represented in charts, tables, pictographs, and bar graphs, using terms such as most, least, equal, more than, less than, and greatest.	• Answer questions about the number of objects represented in a chart, table, pictograph, and bar graph (e.g., category with the most, how many more in a category compared to another, how many altogether in two categories, etc.)	
5. Organize a series of events in correct order on a time line.	• Create a personal timeline.	

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.	