Mathematics Curriculum

Third Grade

By the end of third grade students have mastered (are fluent using the three second rule) addition, subtraction, and multiplication facts, understand place value to the 100,000's place, and use associated vocabulary. They can apply and adapt a variety of appropriate strategies to solve problems. Students can identify and construct geometric shapes according to their properties. They can determine the appropriate units for measurement and compare units. They understand and apply data collection, organization, and representation, to analyze and sort data.
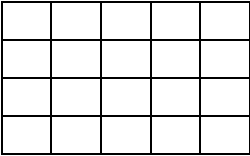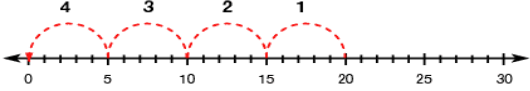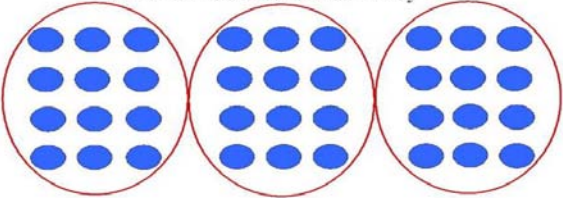
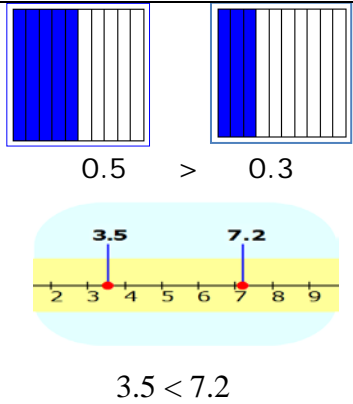**Archdiocese of Santa Fe Standard 1:**   **Numbers and Operations:**
Students understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand meanings of operations and how they relate to one another; and compute fluently and make reasonable estimates. NCTM
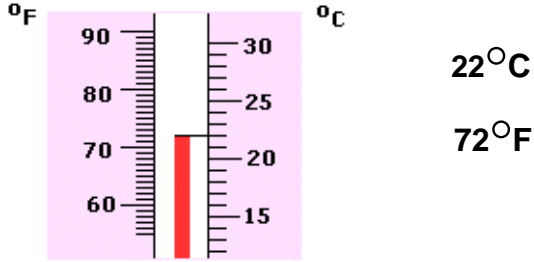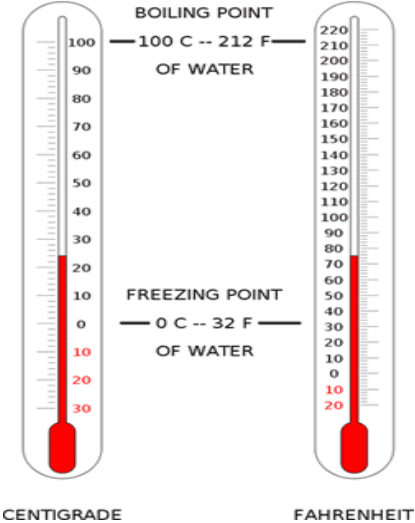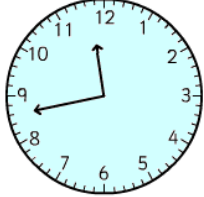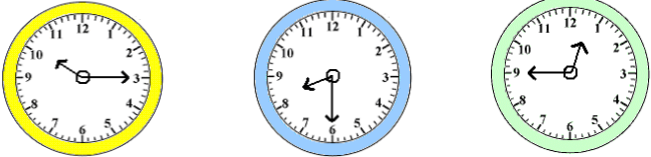
Critical for Mastery in Grade 3

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 if representing numbers, relationships among numbers, and number systems.**		
1. Read whole numbers to 100,000.	• Given a written number students will read orally (i.e. 12,345).	
2. Write whole numbers up to 100,000 in standard, expanded, and word form.	• Standard 12,345. • Expanded 10,000+2,000+300+40+5. • Word: twelve thousand, three hundred forty-five.	
3. Identify place value to 100,000.	• Name place value of the 2 in the following number 12,345. Or, which digit is in the ten thousands place?	

4. Compare two whole numbers to 100,000 using the inequality symbols, <, >, and =.	• 12,345 <67,890 • 67,890 >12,345	
5. Find multiples of whole numbers from 2-10.	• 2 x 1 = 2, 2 x 2 = 4, 2 x 3 = 6 etc.	
6. Order two to three numbers from least to greatest and greatest to least up to 100,000.	• 6190, 6787, 7909 • 7909, 6787, 6190	
B. Addition and Subtraction: **Compute fluently and make reasonable estimates.**		
1. Identify addend and sum of number sentence.	• Addend + Addend = Sum	
2. Identify minuend and difference of number sentence.	• Minuend – a number = Difference	
3. Demonstrate maintenance of mastery of addition and subtraction facts.	• Fluent using three second rule.	
4. Describe the relationship between repeated addition and multiplication.	• 3+3+3 = 9 is same as 3x3 = 9	
5. Find the sum and difference of two whole numbers each between 0 and 100,000 with and without regrouping.	• 98,765 + 43,210 = • 12,345 + 87,654 =	

6. Determine reasonableness of solutions using estimation.	• 3,321 3,000 9,876 10,000
	  +1,234 +1,000 -5,432 - 5,000
	   4,555 4,000 4,444 5,000	

C. Multiplication and Division: **Compute fluently and make reasonable estimates.**		
1. Identify factors and product of number sentence.	• Factor x Factor = Product	
2. Master multiplication fact families 0-12.	• Fluent using three second rule.	

3. Use arrays, number lines, and equal group models to illustrate multiplication and division.	4 rows and 5 in each row = 20 4 x 5 = 20 4 x 5 = 20 and 20 ÷ 4 = 5	
4. Multiply a 2 or 3 digit number by a single digit number.	28 435 x 7 x 9	
5. Identify dividend, divisor, and quotient of a number sentence.	Quotient Divisor)‾Dividend Dividend ÷ Divisor = Quotient	
6. Use models to show an understanding of division of whole numbers.	Write a model to divide 36 by 3. 36 ÷ 3 = 12	
7. Divide a 2 or 3 digit number by a single digit number without a remainder.	2)‾68 5)‾125	
8. Determine reasonableness of solution using estimation.	32 30 68÷2 = 34 x 7 x 7 70÷2 = 35 224 210	
D. Properties: **Understand the meaning of operations and how they relate to one another.**		
1. Identify addition and subtraction as inverse operations.	• 7+3 = 10 • 3+7 = 10 • 10-3 = 7 • 10-7 = 3	
2. Identify multiplication and division as	• $3 \times 7 = 21$, so $21 \div 7 = 3$	

	inverse operations.	
3. Use appropriate operation (+, - , x, or ÷) to solve problems.	• 67 ◯ 24 = 91 7 ◯ 9 = 63 **+** **x**	
4. Use commutative property for addition, and multiplication.	• Addition (6 + 4 = 4 + 6) • Multiplication (8 x 5 = 5 x 8)	
5. Use associative property for addition and multiplication.	• Addition (6 + 4) + 2 → 10 + 2 = 12 and 6 + (4 + 2) → 6 + 6 = 12) • Multiplication (6 x 4) x 2 → 24 x 2 = 48 and 6 (4 x 2) → 6 x 8 = 48)	
6. Use identity property for addition and multiplication.	• Addition (8 + 0 = 8 and 0 + 8 = 8) • Multiplication (1x 8 = 8)	
E. Decimals/Fractions/Ratios/Percents: Understand the meaning of operations and how they relate to one another.		
1. Compare two decimal numbers through tenths using models, illustrations, or number lines.	 0.5 > 0.3 3.5 < 7.2	
2. Add and subtract decimal numbers.		
3. Add and subtract fractions with common denominators.	• 5/10 + 3/10 = 8/10 • 7/10 – 5/10 = 2/10	
4. Identify and write proper, mixed, and improper fractions without simplifying.	• ¾ - proper • 4¾ - mixed number • 7/4 - improper	
5. Determine equivalency among decimals, fractions, and percent.	• Half dollar = 0.50 = 50% • ¼ = 0.25 = 25%	

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 3

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 Measurement: **Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.**		
1. Choose and use appropriate units and measurement tools for measurement.	• Metric　　　　　US Customary 10 mm = 1cm　　　12 in. = 1 foot 100 cm = 1 meter　3 ft. = 1 yard	
2. Measure using the US customary units to ¼ and ½ inch.	• Measure any object or line segment to nearest ¼ inch and ½ inch.	
3. Measure using metric to nearest millimeter and centimeter.	• Measure any object or line segment to nearest mm or cm.	
4. Estimate measurement.	• Given an object estimate the correct unit of measurement (i.e., average man's height 68 ft. or 68 in., length of a paper clip 3 meters or 3 cm?).	
B. Weight: **Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.**		
1. Choose and use appropriate units and measurement tools to quantify properties.	• Metric　　　　　US Customary 1000 (g) = 1 (kg)　16 oz. = 1 lb. 　　　　　　　　　2,000 lb. = 1 ton	
2. Estimate measurement.	• Choose the more reasonable measurement: 　o Paper clip 1 g or 10 kg 　o Bag of potatoes 10 oz. or 10 lbs.	
C. Temperature:		

Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.		
1. Read a Fahrenheit and Celsius thermometer to nearest degree.	• Read thermometer to nearest degree in Fahrenheit and Celsius (greenhouse, outside). °F 90 80 70 60 °C 30 25 20 15 **22°C** **72°F**	
2. Identify freezing and boiling point on Fahrenheit and Celsius scale.	• Using Fahrenheit and Celsius scale, label a thermometer with freezing point and boiling point. BOILING POINT 100 C -- 212 F OF WATER FREEZING POINT 0 C -- 32 F OF WATER CENTIGRADE FAHRENHEIT	
D. Time: **Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.**		
1. Identify and use time intervals: hours,	• 60 seconds = 1 minute	

days, weeks, months, years.	• 60 minutes = 1 hour • 24 hours = 1 day • 7 days = 1 week • 4 weeks = 1 month • 12 months = 1 year	
2. Identify time to nearest minute and relate time to everyday events.	It is almost lunch time. Identify the time on the clock. 11:43 a.m.	
3. Identify time to quarter after, half-past, and quarter till.	quarter past half-past quarter till	
4. Relate time to everyday events.	Katie is ready to eat breakfast. What time is it? 8:07 a.m.	
5. Convert smaller measures of time to larger measures.	• 63 minutes = 1hour and 3 minutes • 17 days = 2 weeks and 3 days.	
6. Find elapsed time.	• If it is 9:45, how many more minutes will it be until 10:00?	
E. Money: **Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.**		
1. Count up to $10.	• Given different denominations of dollars and coins students will be able to count to $10 in different combinations.	
2. Make change to $1.00 counting up.	• You buy some candy that cost $0.39. You pay with a dollar. How much change will you receive back? Count back to 100.	

	1 penny = $0.40, 1 dime = $0.50, 1 quarter = $0.75, and 1 quarter = $1.00	
3. Round to nearest dollar.	• $49.72 is *closer to* $50 than to $49.	
4. Recognize dollar as a whole number and cents as a decimal number.	• 450 cents = $4.50	
5. Recognize money may be represented as fractions of a dollar.	• ¼ of a dollar is 1 quarter $0.25. • ½ of a dollar is 2 quarters $0.50. • ¾ of a dollar is 3 quarters $0.75.	
F. Capacity: **Understand measurable attributes of objects, and the units, systems, and processes of appropriate measurement.**		

1. Choose and use appropriate units and measurement tools to quantify properties (cups, pints, quarts, gallons).	Metric US Customary
	1,000 ml = 1 L 8 oz. = 1 cup
	               4 cups = 1 quart
	               4 quarts = 1 gallon	

2. Estimate measurements.	• Choose the more reasonable measurement: Sally drank 8 oz. or 8 quarts of milk at lunch? Should we buy a 2 L or 2 ml bottle of juice for the party?	
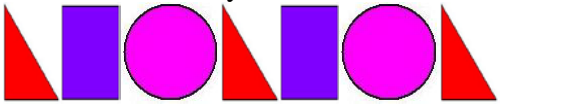
Archdiocese of Santa Fe Standard 3: **Algebra and Problem Solving:**
Students understand patterns, relations, and functions; represent and analyze mathematical situations and structures using algebraic symbols; use mathematical models to represent and understand quantitative relationships; analyze change in various contexts; and apply and adapt a variety of appropriate strategies to solve problems. NCTM

Critical for Mastery in Grade 3

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:		

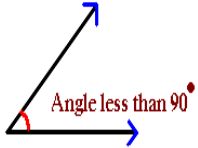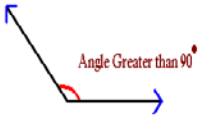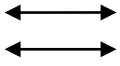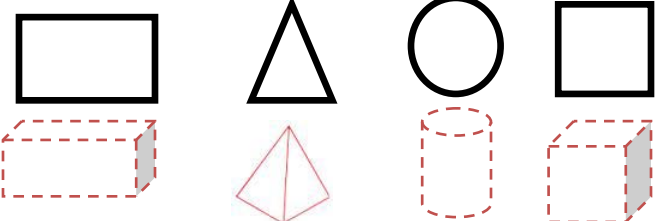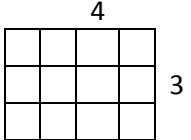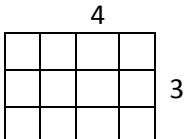|		
Represent and analyze mathematical situations and structures using algebraic symbols.		
1. Find the missing number (variable) in an addition, subtraction, multiplication and division sentence.	• $N+7 = 12$; $N = 5$ • $21-N = 7$; $N = 14$ • $5 \times N = 35$; $N = 7$ • $32 \div N = 8$; $N = 4$	
2. Select appropriate operation or symbol to make and expression true.	• $7 \bigcirc 3 = 21$ $25 \bigcirc 7 = 18$ X -	
B. Equations: **Use mathematical models to represent and understand quantitative relationships.**		
1. Determine a missing number in a simple sequence.	• $(5,10,\_,20)$	
2. Determine a missing number in a basic equation.	• $5 + \square = 10$	
C. Inequality: **Represent and analyze mathematical situations and structures using algebraic symbols.**		
1. Select an appropriate inequality symbol to make an expression true.	• $7+3 \bigcirc 15$ $5 \bigcirc 5 \times 1$ $21 \bigcirc 21 \times 0$ < = >	
D. Patterns, Sequences and Functions: **Understand change in various contexts.**		
1. Predict the next number in a pattern and explain.	• $3,5,7,9,$ _____ Add 2	
2. Name previous number in a pattern and explain.	• ___$,9,14,19$ Subtract 5	

3. Create, describe, and extend numeric and geometric patterns.	• $3,3,6,6,9,9,12,12,15$ __
	  Add 3 to every other number
	
	  Red triangle, purple rectangle, pink circle	
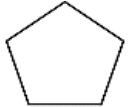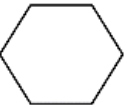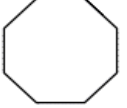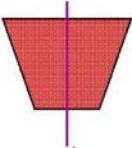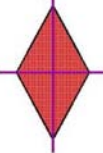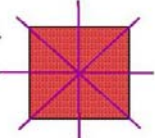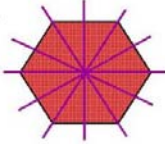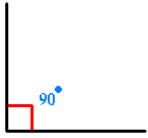
Archdiocese of Santa Fe Standard 4:   **Geometry:**
Students analyze characteristics and properties of two-and-three dimensional geometric shapes and develop mathematical arguments about geometric relationships; specify locations and describe spatial relationships using coordinate geometry and other 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 3

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. Use ordered pairs to graph, locate, and identify points on a grid.		
B. Identify and Classify Shapes: **Analyze characteristics and properties of 2-D and 3-D shapes and develop mathematical arguments.**		
1. Identify and compare 2-dimensional and 3-dimensional geometric shapes.	• Name each 2 dimensional figure (square, rectangle, triangle, circle, including number of sides and vertices). • Name each geometric solid (cube, pyramid, sphere, cylinder).	

2. Identify, describe and classify polygons.	Closed figure made from line segments. Triangle 3 sided polygon Quadrilateral 4 sided polygon Pentagon 5 sided polygon Hexagon 6 sided polygon Octagon 8 sided polygon	
3. Identify lines of symmetry in two dimensional shapes.	Draw all the lines of symmetry for each figure. 1. 3. 2. 4.	
4. Identify right, obtuse, and acute angles.	Acute Angle Obtuse Angle 90° Angle less than 90° Angle Greater than 90°	
5. Identify and draw parallel and congruent lines.	Parallel Lines Congruent Lines	
C. Geometric Formulas: **Use visualization, spatial reasoning, and**		

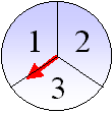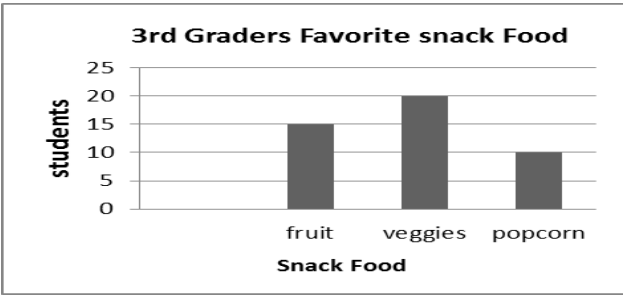| **geometric modeling to solve problems.**		
1. Build, and draw 2 and 3-dimensional geometric objects.		
2. Find perimeter of rectangle using grid paper.	Perimeter = length+width+length+witdth 4+3+4+3 = 14 units	
3. Find area of rectangle using grid paper.	Area = Length x Width 4 x 3 = 12 square units	

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

Critical for Mastery in Grade 3

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. Use tally or organizational tools to collect data of a simple event.	• John took a survery asking students how many brothers and sisters they have. John kept track of the responses in a frequencey table. Number of Siblings | 0	I
---	---
1	IIII
2	II
3	III		
2. Identify mode and median of a data set.	Data: 0.1.1.1.1.1.2.2.3.3.3 Mode: 1 Median: 1	
B. Probability: **Understand and apply basic concepts of probability.**		
1. Conduct simple experiments by determining the number of possible outcomes and make simple predictions.	Spin the spinner. (Possible outcomes will be 1, 2, or 3). I predict I will spin a 1, 2, or 3. I predict that I will spin an odd number more times than an even number.	
2. Identify events as certain, possible, or impossible.	It is **certain** I will spin blue or green. It is **possible** I will spin blue. It is **possible** I will spin green. It is **impossible** to spin red.	
3. Summarize and record results in a clear and organized way.		Spin 1	Spin 2	Spin 3
Blue or Green	Blue or Green	Blue or Green		
4. Use the results to predict further events.	• I predict that when I spin the spinner, the results will be blue or green.	

5. Use physical models, pictures, diagrams to solve problems involving possible arrangements or combinations of two objects.	• A nickel and a dime are tossed. Show all possible outcomes. H=head T=Tails 4 possible outcomes | Nickel	Dime	Outcomes | |---|---|---| | H | H | HH | | | T | HT | | T | H | TH | | | T | TT |
C. Data Analysis: **Develop and evaluate inferences and predictions that are based on data.**	
1. Formulate questions without bias to collect data in contextual situation.	• What is your favorite snack food?
2. Collect and organize data (frequency table).	• 3rd Grade Favorite Snack Food | Kinds of Snack Food	Number of Students | |---|---| | Fruit | 15 | | Veggies | 20 | | Popcorn | 10 |
3. Construct bar graph, pictograph, or line graph with appropriate labels and title from organized data.	
4. Analyze data displayed in a variety of formats to make reasonable inferences and predictions, answer questions, and make decisions.	• More students like veggies than fruit and popcorn. Twice as many students like veggies than popcorn. I predict that students like to eat healthy snacks.

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.	