GRADE 4 MATH OVERVIEW

Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems. Students will engage in many problem solving situations and have an opportunity to reflect upon and express their skills, knowledge and understandings. A variety of ongoing assessments will by used throughout each of the following units:

1. Numbers and Numeration
2. Operations
3. Fractions and Decimals
4. Probability and Statistics
5. Geometry and Measurement
6. Problem Solving

GRADE 4 MATH
INSTRUCTIONAL OUTLINE

1. NUMBERS AND NUMERATION

a) Place value up to 999 and expanded notation
b) Count to 100's by 2's, 3's, 4's, 5's, and 10's
c) Use place value in decimals and in reading numbers through 100,000 with money
d) Round numbers to thousands
e) Introduce concept of positive and negative integers (temperature)
f) Predict odd or even numbers in addition, subtraction, and multiplication
g) Skip count to numbers greater than 100
h) Extend place value to millions and hundredths
i) Round numbers to nearest whole number
j) Look for patterns in sequences of positive numbers
k) Read and write whole numbers to one billion
l) Count and use ordinal numbers through 500
m) Prime Numbers
n) Use a number line and coordinates with positive and negative numbers

2. OPERATIONS

a) Explore different groupings when adding 3 or more numbers (associative property)
b) Use inverse operations with multiplication and division
c) Explore commutative property of multiplication
d) Practice estimation with operations
e) Addition and subtraction mastering sums and differences through 18
f) Explore role of 0 and 1 in multiplication
g) Experiment with grouping (associative property) in multiplication
h) Work with multiplication and division products and quotients through 144
i) Study of algorithms for division (one digit divisor)
j) Explore division in finding number of equal groups of items
k) Concepts of equality and inequality in all four operations ($<$, $>$, $\leq$, $\geq$)
l) Add and subtract whole numbers with sums less that one million
m) Subtract whole numbers when zero is in the minuend with regrouping
n) Find missing digits in a number sentence
o) Introduce concept of a prime factor
p) Multiplication of 2-digit and 3-digit numbers by 2 digits
q) Multiplication by multiples of 10
r) Find common factors of groups of number less than 100
s) Introduce concept of least common factor and greatest common multiple
t) Find quotient and remainder when 2 and 3 digit numbers are divided by one and two digit numbers
u) Investigate distributive property
v) Develop a variety of strategies for estimating addition, subtraction, multiplication, and division

3. FRACTIONS AND DECIMALS

a) Relate units to whole
b) Unit fractions to $^1/_8$, $^1/_{10}$
c) Location of halves, quarters, and eighths on a number line and ruler
d) Find ½, $^1/_3$, ¼, of a number
e) Concept of ratio
f) Order unit fractions using < and > symbols with denominators to 12 and decimals to hundredths
g) Review concept of $1 = {}^2/_2$ etc.
h) Use terms numerator and denominator
i) Find equivalent fractions
j) Relate fractions and decimals to money and metric system
k) Add and subtract like denominators
l) Compare fractions on a number line and decimals to the tenths
m) Study order of unit fractions
n) Correlate the common fraction notation for decimals to the tenths place
o) Introduce addition and subtraction of fractions with unlike denominators
p) Add and subtract decimals to the hundredths place
q) Develop concept of proper and improper fractions
r) Introduce concept of percent
s) Change improper fractions to mixed numbers
t) Compare fractions to fractions, decimals to decimals and fractions to decimals
u) Addition and subtraction of decimals with hundredths and thousandths
v) Practice writing equivalent forms of common fractions and decimals (i.e. ½ = .5)

4. PROBABILITY AND STATISTICS

a) Collect statistical data from newspapers, magazines, polls and activities in other content areas
b) Organize data using tables, and bar graphs, models, pictures, and lists
c) Discuss graphs used in everyday publications
d) Conduct experiments and predict outcomes using equally and unequally likely outcomes
e) Use fractional notation to express probability of outcomes
f) Use orderly methods to count number of outcomes in an experiment (pictures, models, tree diagrams)
g) Make frequency tables from tallied data
h) Examine range and differences between smallest and largest
i) Continue to explore methods of collecting and analyzing data
j) Use models, pictures, tables, graphs and diagrams to represent collected data
k) Compare bar, line, and circle graphs which represent same information and describe trends
l) Determine probabilities of independent events
m) Make arrangements and combinations
n) Find the range, median, mode, and mean in a collection of organized data
o) Draw conclusions and make predictions from graphs
p) Make estimates to compare to actual results of computations
q) Recognize events that are certain and events that have no chance of occurring
r) Make predictions using unbiased random samples (i.e. a set in which every member has an equal chance of being chosen)
s) Determine probabilities of simple events

5. GEOMETRY AND MEASUREMENT

a) Compare temperatures/duration of time
b) Use meter, centimeter, and decimeter for measuring length
c) Weigh objects using grams kilograms
d) Measure time in half hours, quarter hours, 5 minute, 1 minute, and 1 second intervals
e) Make change up to $1.00
f) Measure liquids in liters, milliliters
g) Practice additions of measures
h) Use shapes to create designs
i) Select and use appropriate measurement tools
j) Estimate using actual units of measure
k) Identify equivalent measure within a measuring system
l) Relate the clock to fractions as well as circle construction
m) Investigate properties of plane figures (# of sides, # of angles)
n) Plane figures (polygons and circles)
o) Explore 3-dimensional figures to understand volume
p) Introduce how to use a compass and protractor
q) Find perimeter, area, and volume of specific figures by counting units
r) Use rulers, protractors, and compasses to construct plane geometric figures
s) Use terms such as polygon, circle, chord, radius, angle, diameter, face edge, vertex, line segment, point, parallel, perpendicular, intersecting, and circumference
t) Extend work in coordinate geometry with positive coordinates
u) Be familiar with common metric units used in everyday life
v) Continue to study perimeter and area using graph paper and manipulatives
w) Develop and use formulas for the area of and perimeter of squares and rectangles
x) Measure area and perimeter of rectangles, triangles, circles, and irregular polygons using blocks, geoboards, graph paper, etc.
y) Continue to measure temperature using Celsius and Fahrenheit
z) Use pictures to explore similar and congruent figures; symmetry
aa) Explore connections between factors and multiplication facts and area and volume
bb) Develop a variety of strategies for estimating quantities
cc) Develop strategies for estimating measurement
dd) Recognize, describe, extend and create a wide variety of patterns, including repeated and design patterns
ee) Use a variety of maniplulative materials and technologies to explore patterns
ff) Identify the geometric shapes and faces of prisms, pyramids, cones and cylinders
gg) Identify different types of prisms and pyramids
hh) Discover patterns in nature, art, music, and literature, including tessellations (a repeating shape that completely covers an area with no overlapping and no gaps)

6. PROBLEM SOLVING (MATHEMATICAL REASONING)

a) Describe rationale for grouping or sequencing
b) Categorize objects by attributes
c) Draw pictures and use manipulatives to represent problems
d) Use models, facts and relationships to draw conclusions
e) Use patterns and relationships to analyze math situations
f) Be able to justify answers, math checks
g) Apply a variety of reasoning strategies
h) Develop strategies for selecting appropriate computational and operational methods, such as diagrams, charts, tables, open sentences, patterns, breaking problems into parts
i) Measurement problems related to other areas such as literature, science, and social studies
j) Explore the meaning of large numbers through estimation
k) Discuss real-world examples of when estimating is acceptable and when it is not
l) Determine the reasonableness of results
m) Solve for an unknown using manipulatives (counters)