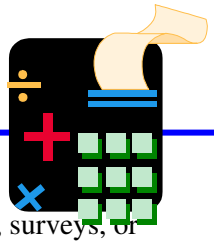
MATH – GRADE 4



Data Analysis, Statistics, and Probability

Students will be able to…

- Formulate questions, collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data.
- Make quick sketches, including a line plot, of the data to use as working tools during analysis
- Describe the overall shape of the data, including clumps, gaps, range, and outliers.
- Summarize what is typical of the data.
- Choose and refines a research question.
- Define the way data will be collected.
- Record data accurately.
- Organize collected data.
- Write a description of data collected.
- Students match representations of a data set such as lists, tables, or graphs with the actual data set.
- Interpret different kinds of graphs.
- Students construct, draw conclusions, and make predictions from various representations of data sets, including tables, bar graphs, pictographs, line graphs, line plots, and tallies.
- Invent representations of data.
- Compare two sets of data using the shape of each set and what's typical in that set.
- Find the median in a set of data arranged in numerical order.
- Find the median in a set of data grouped by frequency.
- Use the median to compare two data sets of data.
- Write an interpretation of the findings from data collected.
- Predict the probability of outcomes of simple experiments.
- Describe events as likely or unlikely and discuss the degree of likelihood using words such as certain, likely, unlikely, equally likely, and impossible.

Geometry

Students will be able to…

- Describe, model, draw and compare and classify 2-D and 3-D shapes.
- Develop concepts and language needed to think about and communicate about spatial relationships in 3-D environments.
- Understand standard drawings of 3-D cube configurations.
- Describe geometric figures such as rectangles and squares in several ways.
- Describe and apply techniques such as reflections, rotations, and translations for determining if two shapes are congruent.
- Compare area of shape.
- Compare shapes that are congruent.
- Predict and validate the results of partitioning, folding, and combining 2-D and 3D shapes.
- Develop skill of translating 2-D pictures into 3-D structures
- Understand geometric perspective.

- Using ordered pairs of numbers and/or letters, graph, locate, identify points, and describe paths (first quadrant).
- Use positive and negative coordinates t name and locate points on grids.
- Calculate distances on a grid based on paths along grid lines.
- Identify and describe line symmetry in 2-D shapes.
- Use mirror and rotational symmetry to place rectangles on a grid and to design complex patterns of rectangles.

Measurement

Students will be able to…

- Demonstrate an understanding of such attributes as length, area, weight, and volume, and select the appropriate type of unit for measuring each attribute.
- Identify benchmarks for the measure of length, weight, volume, and time.
- Order items by measures of weight and by measures of liquid amount.
- Measure weight with a balance scale and weights.
- Develop meaning for the concepts of volume and density; distinguish between quantity and weight.
- Understand that equal fractions of a whole have the same area but are not necessarily congruent.
- Begin to relate cube configurations and the spatial relationships in 3-D objects to volume.
- Carry our simple unit conversions within a system of measurement.
- Measure weight using a pan balance.
- Identify time…compute elapsed time and using a calendar.
- Estimate and find area and perimeter of a rectangle, triangle, or irregular shape using diagrams, models, grids or by measuring.
- Develop strategies for estimating perimeters and areas of rectangles, triangles, or irregular shapes.
- Understand measurements are approximations; investigate how differences in units affect precision. Consider the degree of accuracy needed for different situations.
- Determine when precise measurement is required and when estimates are good enough.
- Identify and use appropriate metric and English units and tools to estimate, measure, and solve problems involving length, area.
- Choose and accurately use appropriate tools for measuring: weight, volume, capacity and time.
- Recognize which measurement units are U.S. standard and which are metric.
- Estimate familiar distances in miles and tenths of miles.
- Measure distance on maps using scales.

Number Sense and Operations

Students will be able to…

- Exhibit an understanding of the base ten number system.
- Add and subtract multiples of 10.
- Estimate how many hundreds are in a group of three-digit numbers.
- Recognize patterns that are useful for multiplying by multiples of 10 (for example: 2x7 = 14; 2 x 70 = 140; 20 x 7 = 140).

- Read, write, and locate in sequence numbers up to 10,000.
- Make sense of the magnitude of numbers up to 10,000.
- Identify and use important landmarks up to 1000 (25, 50,75,100,125,150,Etc.)
- Represent, order and compare numbers.
- Demonstrate an understanding of fractions as parts of wholes and locations on a number line.
- Understand that equal fractions of a whole have the same area but are not necessarily congruent.
- Understand and use fractions that have numerators larger than 1.
- Combine different fractions to make a whole.
- Order fractions using both numerical reasoning and the area model.
- Select, use and explain models to relate common fractions and mixed numbers, find equivalent fractions, and order fractions.
- Recognize parts to make equivalent wholes.
- Compare any fractions to the landmarks 0,1/2,1, and 2.
- Understand the relationships among halves, fourths, and eighths.
- Understand the relationships among thirds, sixths, and twelfths.
- Identify equivalent fractions.
- Have strategies to compare fractions.
- Identify and generate equivalent forms of common decimals and fractions less than one whole.
- Exhibit an understanding of the base ten number system by reading, naming, and writing decimals between 0 and 1 up to the hundredths.
- Recognize classes to which a number may belong, and identify the numbers in those classes. Use these in the solution of problems.
- Recognize a prime number as a number with only one pair of factors and one array.
- Recognize and accurately uses the terms multiple, factor, and prime number.
- Select, use, and explain the various meanings and models of multiplication and division of whole numbers. Understand and use the inverse relationship between the two operations.
- Select, use, and explain the commutative, associative, and identity properties of operations in whole number problem situations.
- Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money.
- Know multiplication facts through 9 x 9 and related division facts.
- Demonstrate fluency of multiplication pairs (for example: either automatically knows the pairs or has one quick strategy for finding the answers).
- Add, subtract, multiply, and divide accurately and efficiently.
- Select and use a variety of strategies to estimate quantities, measures, and the results of whole number computations, and to judge the reasonableness of the answer.

Discussion, Presentation and Composition

Students will be able to…

- Use agreed upon rules to participate in large and small group discussions.
- Express ideas in an organized way.
- Explain their mathematical thinking in writing.
- Maintain a system for collecting, referring to, and sharing their work.