

## BASD GRADE 4 MATHEMATICS LEARNING OBJECTIVES

### 2.1 Numbers, Number Systems and Number Relationships

*By the end of the school year, fourth grade students should be able to:*

**1. Demonstrate an understanding of the use of numbers by:**

- Reading and writing whole numbers up to 1,000,000,000 and decimals through thousandths; identifying places in such numbers and the values of the digits in those places; translate between whole numbers and decimals represented in words and in base-10 notation.
- Reading, writing, and modeling fractions: solving problems involving fractional parts of a region or a collection; describing and explaining strategies used; given a fractional part of a region or a collection, identifying the unit whole.
- Finding multiples of whole numbers less than 10; finding whole-number factors of numbers.

**2. Demonstrate an understanding of ways to represent numbers by:**

- Using numerical expressions involving one or more of the basic four arithmetic operations and grouping symbols to give equivalent names for whole numbers.
- Using numerical expressions to find and represent equivalent names for fractions and decimals; using and explaining a multiplication rule to find equivalent fractions; rename fourths, fourths, tenths, and hundredths as decimals and percents.

**3. Demonstrate an understanding of number relationships by:**

- Comparing and ordering rational numbers up to 1,000,000,000 and decimals through thousandths; comparing and ordering integers between -100 and 0; using area models, benchmark fractions (i.e.,  $\frac{1}{2}$  and  $\frac{3}{4}$ ), and analyses of numerators and denominators to compare and order fractions.

### 2.2 Computation and Estimation

*By the end of the school year, fourth grade students should be able to:*

**1. Compute accurately by:**

- Demonstrating automaticity with basic addition and subtraction facts and fact extensions.
- Using mental arithmetic, paper-and-pencil algorithms, and calculators to solve problems involving the addition and subtraction of whole numbers and decimals through hundredths; describing the strategies used and explain how they work.
- Demonstrate automaticity with multiplication facts through  $10 * 10$  and proficiency with related division facts; use basic facts to compute fact extensions such as  $30 * 60$ .
- Using mental arithmetic, paper-and-pencil algorithms, and calculators to solve problems involving the multiplication of multi-digit whole numbers and the division of whole numbers by 2-digit whole numbers by 1-digit whole numbers; describe the strategies used and explain how they work.
- Using manipulatives, mental arithmetic, and calculators to solve problems involving the addition and subtraction of fractions with like and unlike denominators; describing strategies used.

**2. Make reasonable estimates by:**

- Making reasonable estimates for whole number and decimal addition and subtraction problems and whole number multiplication and division problems; explaining how the estimates were obtained.

**3. Demonstrate an understanding of the meanings of operations by:**

- Using repeated addition, skip counting, arrays, area, and scaling to model multiplication and division.

### 2.3 Measurement and Estimation

*By the end of the school year, fourth grade students should be able to:*

**1. Measure accurately by:**

- Estimating length with and without tools; measuring length to the nearest  $\frac{1}{4}$  inch &  $\frac{1}{2}$  centimeter; estimating the measure the size of angles without tools.
- Describing and using strategies to measure the perimeter and area of polygons; estimating the area of irregular shapes; and finding the volume of rectangular prisms; choosing and using appropriate formulas to calculate areas of rectangles, parallelograms, and triangles, and the volume of a prism; define pi as the ration of a circle circumference to its diameter.
- Describing relationships among U.S. customary units of length and among metric units of length.

**2. Use reference frames correctly (i.e. clocks, thermometers) by:**

- Using ordered pairs of numbers to name, locate, and plot points in the first quadrant of a coordinate grid.

### 2.6 Statistics and Data Analysis & 2.7 Probability and Predictions

*By the end of the school year, fourth grade students should be able to:*

**1. Select and create graphs using data by:**

- Collecting and organizing data or using given data to create charts, tables, bar graphs, line plots, and line graphs.

**2. Analyze and interpret data by:**

- Using maximum, minimum, range, median, mode, and graphs to ask and answer questions, draw conclusions, and make predictions.

**3. Demonstrate an understanding of probability by:**

- Describing events using certain, very likely, likely, unlikely, very unlikely, impossible and other basic probability terms; using more likely, equally likely, same chance 50-50, less likely, and other basic probability terms to compare events; explaining the choice of language.
- Predicting the outcome of experiments; testing the predictions using manipulatives; summarizing results; using summaries to predict future events; expressing probability of an event as a fraction.

### 2.8 Algebra and Functions, 2.10 Trigonometry, & 2.11 Calculus

*By the end of the school year, fourth grade students should be able to:*

**1. Demonstrate an understanding of patterns and functions by:**

- Extending, describing and creating numeric patterns; describing rules for patterns and using them to solve problems; using rules and symbols to describe and write rules for functions involving four basic operations and using those rules to solve problems.

**2. Use symbols to represent and analyze situations by:**

- Using conventional notation to write expressions and number sentences using the four basic operations; determining whether number sentences are true or false; solving open number sentences and explaining solutions; writing expressions and number sentences to model a number story.
- Evaluating numeric expressions containing grouping symbols; inserting grouping symbols to make number sentences true.
- Describing and applying the Distributive Property of Multiplication over Addition to the Partial-Products Multiplication Algorithm.

### 2.9 Geometry

*By the end of the school year, fourth grade students should be able to:*

**1. Demonstrate an understanding of 2 and 3 dimensional shapes by:**

- Identifying, drawing, and describing points, intersecting and parallel line segments and lines, rays, and right, acute, and obtuse angles.
- Describing, comparing, and classifying plane and solid figures including polygon, circles, spheres, cylinders, rectangular prisms, cones, cubes, and pyramids using appropriate geometric terms including vertex, base, face, edge, and congruent.

**2. Apply transformations and symmetry by:**

- Identifying, describing, and sketching examples of reflections; identifying and describing examples of translations and rotations.