

Anchorage School District

Elementary Math Performance Standards

PROGRAM STATEMENT

Mathematical literacy is essential for every individual in today's technological society. A working knowledge of mathematics is needed to deal with the qualitative, quantitative, and spatial relationships that are encountered in everyday life. Therefore, the overall goal of the Mathematics Program for the Anchorage School District is to provide the opportunity for all students to learn, use, communicate, apply, appreciate, and enjoy the mathematics appropriate for their age, needs and ambitions.

GENERAL PROGRAM GOALS

Students will be able to:

1. Use problem-solving approaches to investigate and understand mathematical content.
2. Formulate problems from everyday and mathematical situations.
3. Develop and apply strategies to solve a wide variety of problems.
4. Verify and interpret results with respect to the original problem.
5. Acquire confidence in using mathematics meaningfully.
6. Relate physical materials, pictures, and diagrams to mathematical ideas.
7. Reflect on and clarify thinking about mathematical ideas and situations.
8. Relate everyday language to mathematical language and symbols.
9. Realize that representing, discussing, reading, writing, and listening are vital parts of learning math.
10. Formulate logical conclusions.
11. Use models, known facts, properties, and relationships to explain thinking.
12. Use patterns and relationships to analyze mathematical situations.
13. Relate various representations of concepts or procedures to one another.
14. Make and evaluate mathematical conjectures; justify answers and solutions; validate thinking.
15. Appreciate the pervasive use and power of reasoning as a part of mathematics.
16. Link conceptual and procedural knowledge; recognize relationships among different topics in mathematics; see mathematics as an integrated whole.
17. Explore problems and describe results using graphical, numerical, physical, and verbal models or representations.
18. Use mathematical ideas to further understanding of other mathematical ideas.
19. Use and apply mathematics in other curriculum areas; use mathematics in daily life.
20. Value the role of mathematics in culture and society.

KINDERGARTEN MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD Kindergarten mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

K:1 Estimation

- .1 Make reasonable estimates of more or less than 10.
- .2 Estimate sets of objects using "more" and "less".

K:2 Number Sense:

- .1 Demonstrate a 1 to 1 correspondence with numbers and objects up to 20.
- .2 Read and write numbers to 20.
- .3 Skip counts by 2's to 20, by 5's to 50, and by 10's to 100.
- .4 Count backward from 12.
- .5 Compare and orders numbers to 20.
- .6 Use manipulatives to identify and describe the fractions $\frac{1}{2}$.
- .7 Use manipulatives to represent numbers to 20.
- .8 Count pennies to 20¢, dimes to \$1 and nickels to 25¢.
- .9 Select and use various representations of numbers (i.e. cardinal and ordinal).

K:3 Concepts of Number Operations:

- .1 Model, record, explain addition and subtraction to a sum of 10.
- .2 Use manipulatives to model fact families to sum of 10.
- .3 Use manipulatives to demonstrate equal sharing of 12 items.
- .4 Tell and solve number stories to sum of 10.
- .5 Use manipulatives to find missing addends to the sum of 10.

K:5 Geometry:

- .1 Identify circle, triangle, square, rhombus, rectangle, hexagon, and oval (or ellipse).
- .2 Identify these basic shapes in the real world.
- .3 Draw circles and polygons using a template.
- .4 Sort simple geometric objects by one attribute.
- .5 Order similar shapes by areas (size).

K:6 Measurement:

- .1 Demonstrate linear measurement with non standard units.
- .2 Identify temperature by cold, warm, hot.
- .3 Name the days in order.
- .4 Tell time to the hour.
- .5 Read a calendar (month, day, and date).
- .6 Identify and tell value of penny, nickel, dime and quarter.

K:7 Statistics:

- .1 Correctly use "first", "middle", "last", "most", and "least".
- .2 Collect, organize, and classify data by shape, size, and color.
- .3 Record data by constructing pictographs.

K:8 Probability:

- .1 Correctly use "probably will" and "probably will not".
- .2 Predict outcomes based on a variety of samplings (e.g., areas of spinner colors).

K:9/10 Patterns/Algebra:

- .1 Demonstrate "What's My Rule" by grouping people, pictures, and manipulatives by like attributes.
- .2 Continue a 3 part pattern of numbers, objects or sounds.

K:11 Problem Solving

- .1 Identify questions and statements that are about mathematics.

K:12 Communication:

- .1 Communicate strategies and solutions using manipulatives.

K:13 Reasoning:

- .1 Draw a logical conclusion using terms "more than" and "less than."

K:14 Connections:

- .1 Apply mathematical skills and processes to everyday life (e.g., directions to another classroom or home).

FIRST GRADE MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD First Grade mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

1:1 Estimation

- .1 Make reasonable estimates in 10's to 100.
- .2 Make reasonable estimates of groups of objects.
- .3 Decide whether estimation or counting is appropriate.

1:2 Number Sense:

- .1 Demonstrate 1 to 1 correspondence with numbers and objects up to 100.
- .2 Read and write numbers to 100.
- .3 Skip count by 2's, by 5's, and by 10's to 100.
- .4 Count backward from 25.
- .5 Compare and order numbers to 100.
- .6 Use manipulatives to show that fractions are parts of a whole.
- .7 Use manipulatives to compare and order fractions that have denominators of 2 and 4.
- .8 Demonstrate the commutative and the additive identity properties.
- .9 Use base ten blocks to represent numbers to 100.
- .10 Identify place value in a two digit number.
- .11 Use a variety of coins to show multiple ways to make a dollar.

1:3 Concepts of Number Operations:

- .1 Model, record, explain addition and subtraction to a sum of 20.
- .2 Tell and solve number stories to sum of 20.
- .3 Use manipulatives to demonstrate equal sharing of 20 items.
- .4 Write fact families to sum of 20.

1:4 Computation

- .1 Memorize doubles to sum of 20.
- .2 Memorize all the addition and subtraction facts to sum of 10.

1:5 Geometry:

- .1 Identify plane figures: circle, triangle, square, rhombus, rectangle, hexagon, oval, and trapezoid; and solid figures: cube, pyramid and sphere.
- .2 Construct line segments with a straight edge.
- .3 Demonstrate symmetry using pattern blocks, or by cutting or folding patterns along a single line of symmetry.
- .4 Show examples of geometry in nature.
- .5 Draw and build familiar shapes.

1:6 Measurement:

- .1 Demonstrate linear measurement with non-standard units, inches and centimeters.
- .2 Identify temperature by estimating in Fahrenheit.
- .3 Name the days and the months in order.
- .4 Tell time to the half hour.

1:7 Statistics:

- .1 Collect and organizes data using tally marks to record data.
- .2 Record data by constructing simple bar graphs.
- .3 Use simple charts for reference, comparisons and record keeping.
- .4 Communicate observations of graphed data.

1:8 Probability:

- .1 Correctly use "sure" and "not sure" based on repeated observations.
- .2 Tell what is "fair" or "unfair" based on repeated observations.

1:9 Patterns:

- .1 Continue number patterns to 100.
- .2 Describe the rule or relationship that determines a sequence and continue the sequence.
- .3 Sort sets of things by numeric, geometric, color, or other attributes.

1:10 Algebra:

- .1 Use manipulatives to find single digit missing addends.
- .2 Find the rule, the input or the output to an input/output scenario.

1:11 Problem Solving:

- .1 Formulate problems from practical and mathematical activities.

1:12 Communication:

- .1 Communicate strategies and solutions drawing pictures.
- .2 Use everyday language to explain thinking about mathematical problem strategies and solutions to problems.

1:13 Reasoning:

- .1 Draw logical conclusions about mathematical problems.

1:14 Connections:

- .1 Observe and describe the relationship between the mathematical concepts of addition and subtraction.

SECOND GRADE MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD Second Grade mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

2:1 Estimation

- .1 Make reasonable estimates in increments of 10 and 100.
- .2 Decide whether estimation or counting is appropriate.
- .3 Make reasonable estimates of cost, distance, height, and weight.

2:2 Number Sense:

- .1 Demonstrate 1 to 1 correspondence with numbers and objects up to 500.
- .2 Read and write numbers to 1000.
- .3 Skip counts by 2's, by 5's, and by 10's from any 2 digit number.
- .4 Count backward from 100.
- .5 Compare and orders numbers to 500.
- .6 Read and write simple fractions.
- .7 Use manipulatives to compare and orders fractions that have numerators of 1 and denominators of 2, 3, and 4.
- .8 Demonstrate commutative and additive identity properties.
- .9 Use base ten blocks to represent numbers to 1000.
- .10 Identify place value in a three digit number.
- .11 Identify decimal place value less than 1 by writing part of a dollar with decimals.
- .12 Model coin/dollar equivalencies.
- .13 Count assorted bills and coins to \$50.

2:3 Concepts of Number Operations:

- .1 Model, record, and explain addition and subtraction to a sum of 100.
- .2 Demonstrate equal sharing of 50 items.
- .3 Tell, write, and solve number stories to a sum of 50.
- .4 Use manipulatives to show multiplication as repeated addition of sets, or an array.

2:4 Computation:

- .1 Memorize addition and subtraction facts to sum of 20.
- .2 Write fact families to any sum.
- .3 Use a variety of strategies to find sums and differences of multi-digit numbers.
- .4 Use a calculator to solve multi-step addition and subtraction problems.

2:5 Geometry:

- .1 Name and classify polygons according to the number of sides, angles, and other attributes.
- .2 Draw and name line segments.

- .3 Describe physical world examples using the ideas and concepts of geometry.
- .4 Compare and describe similar geometric shapes as larger, smaller, congruent.
- .5 Use comparative directional and positional words; above, below, inside, outside, on, in, right, left, horizontal, vertical, and middle.
- .6 Complete the mirror image of a pattern block design to demonstrate symmetry.

2:6 Measurement:

- .1 Demonstrate linear measurement with inches, ft, yds, cm's, and m's.
- .2 Categorize measures as distance, weight, or volume.
- .3 Compare relative size of units in like systems of measurement.
- .4 Identify temperature by reading in Fahrenheit.
- .5 Use graph paper to estimate areas of regular shapes.
- .6 Read and interpret a calendar using days, weeks, months, and dates (e.g., tell the date of the third Thursday of the month).
- .7 Tell time to the nearest quarter hour, distinguishing between morning, afternoon, and evening.

2:7 Statistics:

- .1 Correctly use "maximum" and "minimum".
- .2 Records data by plotting data on bar graphs.
- .3 Order data using tables, charts, or graphs.
- .4 Organize data by attributes.
- .5 Collect data and make predictions.

2:8 Probability:

- .1 Correctly use "certain" and "uncertain".
- .2 After sampling, predict outcomes of colored tile picked from a bag.
- .3 Conduct a survey and tally the results.

2:9 Patterns:

- .1 Continue number patterns to 100.
- .2 Describe a pattern physically, pictorially or symbolically; tell the rule or relation that determines the sequence.
- .3 Classify objects by attributes.
- .4 Use a calculator to extend the patterns in a number system

2:10 Algebra:

- .1 Find the rule, the input or the output to an input/output scenario to a sum 50.
- .2 Find missing addends to the sum of 50.
- .3 Write number sentences to represent problems involving different addition and subtraction facts and solve the sentences.
- .4 Complete open space sentences with missing numbers or signs (e.g., $3 _ 3 = 6$).

2:11 Problem Solving:

- .1 Develop and apply strategies to solve a variety of problems and to investigate and understand mathematical continuity.
- .2 Predict an answer before solving a problem and compare results to check for reasonableness.

2:12 Communication:

- .1 Communicate strategies and solutions using words and pictures.
- .2 Use physical materials, models, pictures, and language to represent and communicate mathematical ideas.
- .3 Translate problems from everyday language into mathematical language and symbols.

2:13 Reasoning:

- .1 Find examples that support or refute mathematical statements.
- .2 Explain why a prediction, estimation, or solution is reasonable.

2:14 Connections:

- .1 Observe and describe the relationship between whole numbers and fractions.
- .2 Apply mathematical skills and processes to other disciplines (e.g., cooking and temperature).

THIRD GRADE MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD Third Grade mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

3:1 Estimation:

- .1 Estimate numbers in increments of 10, 100, and 1000.
- .2 Estimate order of magnitude - number of digits in a product, more or less than a day, hour, etc.
- .3 Estimate length, area, volume, and weight using metric and standard units.

3:2 Number Sense:

- .1 Skip count by numbers through 10, by 100, and 1000, forward or backward from any number.
- .2 Read and write numbers to 999,999.
- .3 Compare and order numbers to 999,999.
- .4 Compare and order fractions that have the same numerators or the same denominators.
- .5 Demonstrate commutative, and identity properties - add 0 or multiply by 1.
- .6 Use base ten blocks to represent numbers over 1000.
- .7 Identify place value in a six digit number.
- .8 Use decimal notation for monetary values.
- .9 Identify decimal place value less than 1 by coloring tenths and hundredths on a hundredths chart.
- .10 Identify, represent, and explain place value concepts using models, pictures and words.
- .11 Identify multiples of whole numbers using models, pictures, and symbols.
- .12 Model fractions and decimals using real world examples.
- .13 Count assorted bills and coins to \$100.
- .14 Make change by counting up from the amount of purchase to \$10.
- 3:2.15** Identify and describe different representations for the same number.

3:3 Concepts of Number Operations:

- .1 Use manipulatives to invent and model different procedures for finding differences, sums, products and quotients of whole numbers.
- .2 Use a rectangular array to model multiplication and division stories.
- .3 Demonstrate equal sharing of 100 items.
- .4 Model, record, and explain addition and subtraction with regrouping, to a sum of 1000.
- .5 Select and use appropriate number operations to solve problems.
- .6 Demonstrate that " - " can mean take away, or difference.

3:4 Computation:

- .1 Add and subtract with regrouping, to a sum of 1000.
- .2 Use an alternate number operation to check solutions.
- .3 Memorize multiplication and division facts to product of 50.
- .4 Write fact families for products to 50.

- .5 Tell or write and solve number stories for products to 50 and sums to 100.
- .6 Add and subtract fractions with like denominators.
- .7 Use mental math when appropriate.
- .8 Use a calculator when appropriate.

3:5 Geometry:

- .1 Draw and name points, segments, rays and lines, identifying midpoints and intersections.
- .2 Identify circles, basic polygons and solids.
- .3 Identify right angles and compare other angles to them.
- .4 Show an understanding of symmetry by cutting or folding patterns along at least two lines of symmetry.
- .5 Use manipulatives to construct 2-D and 3-D shapes.
- .6 Identify and describe properties of congruent shapes.

3:6 Measurement:

- .1 Measure to the nearest inch, foot, yard, centimeter and meter.
- .2 Measure to the nearest pound or kilogram.
- .3 Compute area and perimeter of given squares and rectangles using manipulatives or grids.
- .4 Use manipulatives to find the perimeter of irregularly shaped figures.
- .5 Compare various triangles and quadrilaterals according to their sides and/or angles.
- 3:6.6** Read temperature in Fahrenheit and Celsius.
- .7 Convert between days, weeks, and months.
- .8 Tell time to the minute, using an analog clock and identifying A.M. and P.M.
- .9 Find elapsed time to the hour.

3:7 Statistics:

- .1 Classify and reclassify data by a variety of attributes.
- .2 Collect and organize data in a chart, table, or graph, and identify the median and the mode.
- .3 Describe and explain data from tables, charts and graphs; use the data to make predictions.

3:8 Probability:

- .1 Correctly use "50-50 chance", "likely", "unlikely".
- .2 Tell why a game is unfair if players use dice that are marked differently.
- .3 After sampling, predict the most likely outcome from combining the results of 2 spinners or dice.
- .4 Create simple probability story problems about chance occurrences.

3:9 Patterns:

- .1 Continue number patterns to 1000.
- .2 Find, recognize, describe, and extend patterns.
- .3 Identify and describe fact table patterns.

3:10 Algebra

- .1 Find the rule, the input, or the output to input/output scenarios to a sum or product of 100.
- .2 Write number sentences using letters or shapes to represent missing numerals.
- .3 Use manipulatives to solve problems containing an unknown.
- .4 Find missing factors to product of 50.

.5 Write and solve word problems that use equations containing a variable.

3:11 Problem Solving:

1. Use mathematical terms and symbols to summarize a problem.

3:12 Communication:

.1 Communicate strategies and solutions by writing explanations.

.2 Listen and observe to obtain mathematical information from the real

world.

3:12.3 Use concrete, pictorial, and symbolic methods to represent mathematical and real life situations.

3:13 Reasoning:

.1 Given a rule or generalization, determine whether or not the example fits.

3:14 Connections:

.1 Translate between various representations of equivalent numbers (e.g., percents of a dollar to cents, fractional forms of 1 to a whole number).

.2 Apply mathematical skills and processes to everyday life (e.g., map reading).

FOURTH GRADE MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD Fourth Grade mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

4:1 Estimation:

- .1 Estimate numbers in multiples of 10 to 1,000,000.
- .2 Decide to what place it is reasonable to round given data.
- .3 Round numbers to estimate the answer to a word problem.
- .4 Estimate volume, capacity, length, and weight using metric, standard and non-standard (personal reference) units.

4:2 Number Sense:

- .1 Order, read, and write numbers from 0 to 1,000,000.
- .2 Use a fraction to name a part of a region.
- .3 Find a fractional part of a set of objects.
- .4 Identify and describe different uses for fractional representations (e.g., division, ratios, or proportions).
- .5 Give equivalent names for whole numbers, fractions and decimals.
- .6 Order fractions using pictures, symbols or models.
- .7 Identify, represent and explain place value using money, models, pictures, symbols, and words.
- .8 Use an array to model and solve a word problem.
- .9 Use models, symbols, pictures and words to identify the factors of a given product.
- .10 Read and write Roman numerals to 100.

4:3 Concepts of Number Operations:

- .1 Use manipulatives to model a strategy or procedure for finding sums, differences, products, and quotients.
- .2 Use manipulatives and diagrams to model and solve word problems involving addition, subtraction, multiplication and division.
- .3 Create and solve word problems using addition, subtraction, multiplication and division.
- 4:3.4 Show comparisons as ratios.

4:4 Computation:

- .1 Memorize multiplication and division facts to product of at least 100.
- .2 Multiply by powers of ten.
- .3 Use an algorithm to find a product, using 2 digit multipliers.
- .4 Use an algorithm to find the quotient of multi-digit dividend, using a one digit divisor.
- .5 Compute sums, differences, products, and quotients using money.
- .6 Use mental math when appropriate.

- .7 Use a calculator when appropriate.
- .8 Use an alternative or opposite operation to verify a solution.

4:5 Geometry:

- .1 Draw and label parallel and perpendicular lines.
- .2 Classify angles as right, obtuse, acute or straight.
- .3 Classify polygons and other two dimensional figures from visual and verbal clues.
- .4 Identify and describe properties of polygons.
- .5 Identify, classify, and compare various triangles and quadrilaterals according to their sides and/or angles.
- .6 Locate points specified by ordered pairs, on a rectangular coordinate grid.
- .7 Use a line of reflection to complete symmetric pictures.
- .8 Draw lines of symmetry in regular polygons or pictures.
- .9 Identify and model geometric figures that are congruent, or symmetrical.

4:6 Measurement:

- .1 Measure line segments to the nearest centimeter.
- .2 Convert between millimeters, centimeters and meters.
- .3 Measure line segments to the nearest $\frac{1}{2}$ inch.
- .4 Convert between inches, feet, and yards.
- .5 Find the perimeter of regular and irregular shapes.
- .6 Approximate the area of an irregular polygon.
- .7 Find perimeter and area of a region represented by a scale drawing.
- .8 Find the area and perimeter of rectangles.
- .9 Write and solve word problems involving map scales, elapsed time, and temperature.
- .10 Write and solve word problems involving metric and standard units of volume or capacity, weight and length.
- .11 Find elapsed time to the minute.

4:7 Statistics:

- .1 Find the mean, median, mode and range of a set of data.
- .2 Collect and organize data; use it to construct a chart, table, or graph.
- .3 Describe and explain data from tables, charts and graphs; and use the data to make predictions.

4:8 Probability:

- .1 Correctly use "chance", "likely", "unlikely", "certain", and "luck".
- .2 Present probability data using fractions.
- .3 Design a spinner using given criteria, make predictions, record the results, and compare the predicted outcome with the actual results.
- .4 Create and solve probability problems about chance occurrences that are expressed as simple fractions.

4:9 Patterns:

- .1 Find a pattern, explain its rule and extend the pattern.
- .2 Explain the patterns in place value charts, fact tables and other data displays.

4:10 Algebra:

- .1 Use manipulatives to solve problems containing an unknown.
- .2 Write number sentences using letters or shapes to represent variables.
- .3 Solve number sentences with missing addends and factors.
- .4 Find missing factors to product of 100.
- .5 Write and solve word problems that use equations containing a variable.

4:11 Problem Solving:

- .1 Solve problems by selecting and using a variety of strategies.

4:12 Communication:

- .1 Write and verbalize explanations of strategies used to solve problems.

4:13 Reasoning:

- .1 Justify the reasonableness of answers, solution processes and mathematical strategies.

4:14 Connections:

- .1 Observe and describe the relationship between mathematical concepts.

FIFTH GRADE MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD Fifth Grade mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

5:1 Estimation:

- .1 Decide to what place it is reasonable to round given data.
- .2 Estimate the measure of angles.
- .3 Estimate large distances, time, population, or objects based on small samples.
- .4 Round numbers to estimate answers to algorithms and word problems.

5:2 Number Sense:

- .1 Order, read, and write numbers from thousandths to billions.
- .2 Round large and small numbers to a given place.
- .3 Convert between mixed numbers and their equivalent fractions.
- .4 Compare and order fractions using models, pictures, symbols and words.
- .5 Compare and order decimals from 0.001 to 1, using models pictures, symbols and words.
- .6 Identify and describe factors and multiples, including factors and multiples common to a pair or set of numbers (GCF and LCM).
- .7 Identify and explain prime and composite numbers using models, pictures, symbols and/or words.
- .8 Convert between simple fractions, decimals, and percents.
- .9 Model and explain the process of multiplication and division.
- .10 Identify and describe a variety of uses for a fractional representation.
- .11 Compare and order positive and negative numbers.

5:3 Concepts of Number Operations:

- .1 Write and solve word problems involving each operation.
- .2 Use manipulatives to find sums and differences of simple fractions and decimals.
- .3 Write and solve problems involving fractions and decimals.
- .4 Demonstrate the commutative and identity properties of multiplication.
- .5 Demonstrate that " \div " can mean subtraction of equal parts or equal sharing.

5:4 Computation:

- .1 Model and explain addition and subtraction of fractions with like and unlike denominators.
- .2 Find the factors of a number.
- .3 Find the product of multi-digit numbers and of decimal numbers.
- .4 Solve problems using multiplication and division of whole numbers and money.
- .5 Solve word problems involving addition and subtraction of fractions and decimals.
- .6 Use mental math when appropriate.
- .7 Use a calculator when appropriate.

5:5 Geometry:

- .1 Name and classify 2- and 3- dimensional geometric shapes.
- .2 Compare properties of polygons and polyhedrons.
- .3 Plot ordered pairs on a rectangular coordinate grid and connect the points.
- .4 Identify geometric shapes found in nature.
- .5 Show translations and rotations of 2-D figures.

5:6 Measurement

- .1 Explain how to find a formula for the area of a triangle, rectangle, and parallelogram.
- .2 Estimate the circumference of a circle.
- .3 Estimate the area of a circle.
- .4 Use a protractor to draw and measure angles.
- .5 Measure line segments to the nearest eighth of an inch, or millimeter.
- .6 Measure and find distance on a map, given its scale.
- .7 Make a scale drawing.
- .8 Find possible perimeters for a rectangle of a given area.
- .9 Find possible areas for rectangles of a given perimeter.
- .10 Find the surface area of a cube and rectangular prism.
- .11 Given a rate for multiple units, find the rate per unit.
- .12 Solve word problems using rates.

5:7 Statistics:

- .1 Find the mean, mode, median, and range of a set of data.
- .2 Collect and organize data; use it to construct a chart, table, or graph.
- .3 Describe and explain data from tables, charts and graphs; and use the data to predict an outcome.
- .4 Evaluate data to determine validity, propaganda, and prejudice or bias.
- .5 Justify the choice of data representation (type of graph).

5:8 Probability:

- .1 Present probability data using fractions or percents.
- .2 In an experiment using given criteria, make predictions, record the results, and compare the predicted outcome with the actual results.
- .3 Create probability problems about chance occurrences expressed as simple fractions and percents.
- .4 Make a data set, given the median and maximum values and the range.

5:9 Patterns:

- .1 Describe patterns found in nature.
- .2 Use manipulatives to show how changes in perimeter affect area.
- .3 Find a pattern, explain its rule and extend the pattern.
- .4 Explain the patterns found in tables, graphs, rules and formulas.
- .5 Explain how to use patterns as a strategy for problem solving.
- .6 Use a calculator to find a missing item in a number sequence.

5:10 Algebra:

- .1 Write and solve simple number sentences that contain a variable.

- .2 Graph a table of values on a coordinate grid.
- .3 Analyze graphs and tables, and make predictions.
- .4 Substitute values for variables in a formula, and evaluate it.

5:11 Problem Solving:

- .1 Solve a problem and verify solutions applying results of previous problem solving experiences.

5:12 Communication:

- .1 Explain strategies used to solve problems.
- .2 Use the mathematical vocabulary appropriate to the content being studied.

5:13 Reasoning:

- .1 Draw logical conclusions about mathematical situations using informal inductive and deductive reasoning.

5:14 Connections:

- .1 Apply mathematical processes to other disciplines such as sports events timing.
- .2 Use longitude and latitude readings to locate positions on a map.

SIXTH GRADE MATH PERFORMANCE STANDARDS

Each ASD mathematics course reflects the program statement and incorporates the general program goals. In addition, each course consists of a specific set of standards that determine the course content and a set of performance standards that delineate what a student should be able to do after successfully completing the course. After satisfactorily completing the ASD Sixth Grade mathematics curriculum, a student will be proficient in the fourteen strands of mathematics which comprise the mathematics curriculum. As evidence of proficiency, the student will be able to:

6:1 Estimation:

- .1 Explain to what place it is reasonable to round given data.
- .2 Estimate lengths, weights, areas, and volumes.
- .3 Estimate products and quotients.
- .4 Estimate the fractional part or percent of a whole.
- .5 Estimate the measure of angles.
- .6 Round numbers to estimate answers to word problems.
- .7 Use estimation to check reasonableness of results of operations.

6:2 Number Sense:

- .1 Model the rounding of large and small numbers to a given place.
- .2 Model, order, read, and write whole numbers, fractions, decimals, percents, and ¹.
- .3 Order, read, and write positive and negative numbers.
- .4 Convert data from tables to fractions, decimals, and percents.
- .5 Convert between mixed numbers, fractions, and decimals.
- .6 Identify and explain prime and composite numbers.
- .7 Simplify fractions.
- .8 Use models, pictures, or symbols to show equivalent representations of a ratio.

6:3 Concepts of Number Operations:

- .1 Write and solve word problems involving fractions and decimals.
- .2 Use models, pictures, or symbols to solve word problems using rational numbers.
- .3 Use manipulatives to model and explain strategies for finding sums, differences, products, and quotients of decimals and fractions.
- .4 Show that the product of a number and its reciprocal is one.
- .5 Write the product of repeated factors in exponential form.
- .6 Demonstrate that “ - ” can mean: take away, difference or "the opposite of".

6:4 Computation:

- .1 Find a quotient using a two-digit divisor.
- .2 Convert fractions to equivalent mixed numbers or decimals.
- .3 Find sums, differences, products and quotients of fractions, decimals, and mixed numbers.
- .4 Find sums and differences of positive and negative numbers.
- .5 Find equivalent values between fractions, decimals, and percents.
- .6 Find the percent of a number.
- .7 Use mental math when appropriate.

.8 Use a calculator when appropriate.

6:5 Geometry:

- .1 Identify and classify 2- and 3- dimensional geometric shapes in the real world.
- .2 Compare properties of 2- and 3- dimensional shapes.
- .3 Construct a circle with a given diameter or radius.
- .4 Use corresponding sides and angles to identify similar polygons.
- .5 Use a ruler and protractor to construct congruent triangles and quadrilaterals.
- .6 Use a compass and a straight edge to construct a figure from a given set of directions.

6:6 Measurement

- .1 Use a protractor to draw and measure angles.
- .2 Find the surface area of a cube, rectangular prism, and pyramid.
- .3 Find the volume of a cube and a rectangular prism.
- .4 Use manipulatives to explain how to find the circumference and area of a circle.
- .5 Solve rate problems involving life applications.
- .6 Measure to the nearest $\frac{1}{8}$ of an inch or one millimeter.
- .7 Use manipulatives and grids to construct scale drawings and models.

6:7 Statistics:

- .1 Find the mean, median, mode, and range of a set of data.
- .2 Collect and organize a set data.; use it to construct charts, tables, or graphs.
- .3 Describe and explain data from tables, charts and graphs; and use the data to predict an outcome.
- .4 Evaluate data to determine reasonableness, validity, propaganda, and prejudice.

6:8 Probability:

- .1 Present a set of probability data using percents and ratios.
- .2 Design an experiment with given criteria, make predictions, record the results, and compare the predicted outcome with the actual results.
- .3 Compute the probability of chance and expected outcomes.
- .4 Create a data set, given the maximum and minimum values and the mean.
- .5 Create probability problems about chance occurrences that are expressed as simple ratios and percents.

6:9 Patterns:

- .1 Identify and continue number sequences and geometric patterns.
- .2 Find and describe patterns in nature.
- .3 Explain patterns in the relationships between area and perimeter.
- .4 Use symbols to describe number patterns.
- .5 Create a story that describes the behavior of a graph.
- .6 Find a pattern, explain its rule, and extend the pattern.
- .7 Explain the patterns found in tables and graphs.
- .8 Explain how to use patterns as a strategy for problem solving.

6:10 Algebra:

- .1 Use manipulatives to model and solve simple algebraic problems created from life situations.
- .2 Graph data from a table of values.
- .3 Complete a table using a formula.
- .4 Use manipulatives to solve a simple equation.
- .5 Explain the process used to solve a one-step equation.
- .6 Apply the rules for order of operations and parentheses to simplify number sentences.
- .7 Use symbols to model a word problem.
- .8 Write and solve number sentences that contain a variable.

6:11 Problem Solving:

- .1 Analyze and summarize a problem using the relationships that exist between the known facts and unknown information.

6:12 Communication:

- .1 Explain strategies used to solve problems involving multiple operations.

6:13 Reasoning:

- .1 Justify solutions using examples and counter examples.

6:14 Connections:

- .1 Apply mathematical skills and processes to other disciplines (e.g., time lines in social studies and scientific notation in space distances).