

MSAD #53 Math Curriculum

Philosophy Statement

MSAD #53 believes that a strong foundation in mathematics is essential for success in life. A rich mathematics program enables students to develop an understanding of basic mathematical concepts and to apply these concepts with confidence as they solve both abstract and practical problems. The MSAD #53 mathematics program seeks to demonstrate the connections mathematics has to other school subjects as well as to everyday life.

MSAD #53 seeks to provide an atmosphere of carefully guided instruction through which students progress from learning and applying mathematics in the concrete realm to abstract thinking and application of mathematics, encouraging the use of technology, manipulatives, cooperative group work, and the use of journaling and shared thinking about problem solving.

MSAD #53 Curriculum: Math PreK-2***Fundamental Knowledge & Skill – A Numbers & Number Sense***

Students will develop an understanding of numbers – what they mean and how they are used in everyday life.

Indicator 1: Students will develop an ability to demonstrate, using mathematical tools, what numbers signify. **(MLR-A-1)**

SWBAT...

- ...write numbers 0-12 **(K)**
- ...identify a calculator, computer and tools (rulers, balance scales, tape measure yard/meter stick) for mathematics. **(K)**
- ...use computers for *Investigations* and other math software programs. **(K,GR1,GR2)**
- ...use other math tools, i.e., cubes, to investigate numbers. **(K,GR1,GR2)**
- ...orally say the months of the year. **(GR1)**
- ...reads, writes, and sequences numbers to 100. **(GR1)**
- ...use numerals to record how many for quantities up to 40. **(GR1)**
- ...associate number words with corresponding written numerals. **(GR1)**
- ...form arrays that represent numbers. **(GR2)**

Indicator 2: Students will develop an ability to see the use of numbers in many practical situations. **(MLR-A-2)**

SWBAT...

- ...use one-to-one correspondence as a way to compare two sets. **(PreK)**
- ...indicate the position of a concrete object from left-right, right-left, top-bottom, bottom-top, before-after, next to, in the middle of. **(K)**
- ...can use sequencing as an organizational strategy. **(K)**
- ...show number values for number symbols 0-20. **(K)**
- ...determine the number of practical, concrete objects (like coins) there are in a collection or set; one-to-one correspondence to 20. **(K)**
- ...use numerals to record how many for quantities up to 40. **(GR1)**
- ...use landmark numbers such as 10,25,100,1000. **(GR2)**
- ...work with dollars and coins up to \$1.00. **(GR2)**
- ...use numbers to express measurement. **(GR2)**
- ...follow simple recipes. **(GR2)**
- ...use fractions ($1/4, 1/2, 1/3, 1/6, 1/8$) to make and break wholes. **(GR2)**
- ...follow directions in a play (e.g., 1st, 2nd, 3rd, etc). **(GR2)**

Indicator 3: Students will develop an ability to count, estimate, describe, order and compare and apply place values to numbers up to 1,000. **(MLR-A-3)**

SWBAT...

- ...identify and use positional words (ON TOP OF, BEHIND, UNDER, BESIDE, AROUND). **(PreK)**
- ...rote count to 10 or so connecting number words and symbols to the objects counted. **(PreK)**

- ...identifies the last number counted as the total. (**PreK**)
- ...rote count 0-50, transitioning from 10 automatically. (**K**)
- ...rote count by 10's to 100. (**K**)
- ...rote count by 5's to 30. (**K**)
- ...order, read and sequence numbers 0-20 (**K**)
- ...write numbers 0-12. (**K**)
- ...using numbers 0-20, say MORE or LESS, GREATER THAN, LESS THAN.(**K**)
- ...recognize, recall, and identify numbers 0-20 by sight and sound. (**K**)
- ...order orally the days of the week. (**K**)
- ...indicate the position of a concrete object including ABOVE, UNDER, BELOW, BEHIND, IN, OUT, ON. (**K**)
- ...order quantities from least to most. (**K**)
- ...use an accurate strategy to count backwards and forwards from 0-15 from memory. (**K**)
- ...keep track while counting objects in a set of at least 6. (**K**)
- ...count real life objects in and out of the classroom. (**K**)
- ...reads, writes, and sequences numbers to 100. (**GR1**)
- ...order orally the months of the year. (**GR1**)
- ...accurately counts sets of numbers up to 40. (**GR1**)
- ...begin to estimate, predict and compare. (**GR1**)
- ...counts and keeps track of quantities up to 50. (**GR1**)
- ...fill a given region with shapes (label a picture with fractions). (**GR1**)
- ...identify equal or unequal parts of a whole ($1/2, 1/4, 1/3$). (**GR1**)
- ...count from 0-1000. (**GR2**)
- ...count objects. (**GR2**)
- ...group objects by the number of objects in the group. (**GR2**)
- ...describe place values up to and including 1000. (**GR2**)
- ...form arrays that represent numbers. (**GR2**)
- ...identify halves of the arrays. (**GR2**)
- ...describe fractional parts of an array numerically and visually. (**GR2**)
- ...identify halves of a 3-D solid. (**GR2**)
- ...form and divide a 2-D array into thirds, fourths, sixths, eighths. (**GR2**)

Indicator 4: Students will develop an ability to reason through the results of problems involving quantity. (**MLR-A-4**)

SWBAT...

- ...keep track of a growing collection of up to 20 objects. (**K**)
- ...investigate and recognize patterns by two out of three criteria using practical, concrete objects and situations (from color, shape, size). (**K**)
- ...counts and keeps track of quantities up to 50. (**GR1**)
- ...justify their predictions. (**GR1**)
- ...determine LARGER, SMALLER, MORE, LESS, etc. (**GR2**)
- ...use landmark numbers to reason out results. (**GR2**)

Fundamental Knowledge & Skill – B Computation

Students will develop an understanding of how to use and apply mathematics - the skills involved in mathematical applications, computation, reasoning, problem-solving and decision-making.

Indicator 1: Students will develop an ability to estimate – with quantities, computations, problem-solving. **(MLR-B-1)**

SWBAT...

- ...recognize the subject matter as math. **(K)**
- ...identify materials as math materials. **(K)**
- ...count and name real life classroom objects out of the classroom in daily routines. **(K)**
- ...associate the study of math with the study of numbers, shapes, design. **(K)**
- ...use math to determine how many objects, how many more objects, how many fewer objects there are in real life situations. **(K)**
- ...begin to estimate quantities. **(K)**
- ...begin to use the words: ABOUT, NEAR, CLOSER TO, BETWEEN, A LITTLE LESS THAN in estimation. **(GR1)**
- ...estimate “how much” in volume. **(GR2)**
- ...estimate “how far” in distance. **(GR2)**
- ...estimate “how long, short, wide, tall” with measurement. **(GR2)**
- ...estimate answers in computation problems. **(GR2)**
- ...estimate solutions to practical problems involving mathematics. **(GR2)**
- ...use the words: ABOUT, NEAR, CLOSER TO, BETWEEN, A LITTLE LESS THAN in estimation. **(GR2)**

Indicator 2: Students will develop an ability to use more than one strategy to solve problems that require addition and/or subtraction of whole numbers. **(MLR-B-2)**

SWBAT...

- ...perform simple additions between the numbers 0-6. **(K)**
- ...perform simple addition 0-6, symbolic and concrete. **(K)**
- ...perform simple subtraction 0-6, concrete. **(K)**
- ...draw pictures to represent problems. **(K,GR1,2)**
- ...use discussion to understand mathematical problems. **(K,GR1, GR2)**
- ...find combination of numbers up to 20. **(GR1)**
- ...solves story problems involving addition using direct modeling and counting up/down. **(GR1)**
- ...finds different combinations for one number. **(GR1)**
- ...finds the total of two single-digit numbers. **(GR1)**
- ...finds the total of several small single digit numbers. **(GR1)**
- ...finds more than one solution to a problem that has multiple solutions. **(GR1)**
- ...finds the total of two numbers up to 20. **(GR1)**
- ...solves story problems involving addition using numerical relations. **(GR1)**
- ...solves story problems involving subtraction using direct modeling, counting up/down, and numerical relations. **(GR1)**
- ...count on. **(GR2)**
- ...describe the relationship between addition and subtraction. **(GR2)**
- ...demonstrate strategies for adding two or more numbers. **(GR2)**
- ...explain subtraction as ‘take away’ comparison and unknown change. **(GR2)**

- ...solve addition and subtraction problems with 1-digit and 2-digit numbers with and without regrouping. **(GR2)**
- ...add and subtract 3-digit numbers without regrouping. **(GR2)**
- ...compare and combine numbers using the 100's chart. **(GR2)**
- ...describe a variety of problem-solving strategies and distinguish which problem-solving strategy would be best given the numbers in the problem. **(GR2)**

Indicator 3: Students will develop an ability to add and subtract using a variety of materials, strategies, language, and symbols. **(MLR-B-3)**

SWBAT...

- ...show number values for number symbols to 20. **(K)**
- ...demonstrate understanding by responding appropriately to the following vocabulary words: COUNT, SORT, NUMBER WORDS, PATTERN/SEQUENCE WORDS, POSITION WORDS, DAYS OF THE WEEK, MEASUREMENT WORDS, SHAPE WORDS, COLOR WORDS, TIME WORDS, COMPUTER WORDS, CALCULATOR WORDS, ADD, TAKE AWAY. **(K)**
- ...recognize and name the symbols: + - = . **(K)**
- ...finds combination of numbers up to 20. **(GR1)**
- ...finds the total of two numbers up to 20. **(GR1)**
- ...work effectively with combinations of 10. **(GR1)**
- ...records problem-solving strategies using pictures, numbers, words and equations. **(GR1)**
- ...solves story problems involving addition using direct modeling and counting up/down. **(GR1)**
- ...finds different combinations for one number. **(GR1)**
- ...records solutions using pictures, numbers, words and equations. **(GR1)**
- ...finds more than one solution to a problem that has multiple solutions. **(GR1)**
- ...compare problem-solving solutions and strategies when adding and subtracting. **(GR2)**
- ...describe a variety of problem-solving strategies and distinguish which problem-solving strategy would be best given the numbers in the problem. **(GR2)**
- ...demonstrate a mastery of addition and subtraction facts to 20, using a variety of strategies. **(GR2)**

Fundamental Knowledge & Skill – C Data Analysis & Statistics

Students will develop an understanding of how numbers help make meaning of data: the processes of data collection, analysis, interpretation, as well as drawing conclusions from data.

Indicator 1: Students will develop an ability to use data to solve problems. **(MLR-C-1)**

SWBAT...

- ...use a survey. **(K)**
- ...collect & record data & observations at a concrete level. **(K)**
- ...record and represent quantities using objects, pictures, numbers, and/or words. **(K)**
- ...sort and categorize data. **(GR1)**
- ...explain and interpret survey results. **(GR1)**
- ...describe data quantitatively. **(GR1)**
- ...interpret data sets that show values and categories at the same time. **(GR1)**
- ...make a plan for gathering and recording data. **(GR1)**

- ...collect and keep track of data. (GR1)
- ...interpret data. (GR1)
- ...formulate a problem to solve using data. (GR2)
- ...determine and collect data appropriate to the problem to be solved. (GR2)
- ...arrange data in ways that facilitate the solving of the problem. (GR2)
- ...manipulate data to make meaningful interpretations about the data. (GR2)
- ...use data to solve problems. (GR2)

Indicator 2: Students will develop an ability to graphically depict data. (MLR-C-2)

SWBAT...

- ...describe data represented on a graph. (K)
- ...find and record different ways to arrange a set of objects. (K)
- ...collect and keep track of data. (GR1)
- ...invent and construct representations of data. (GR1)
- ...organize and order data about birthdays. (GR1)
- ...create a representation of data involving several categories. (GR1)
- ...compare two data sets. (GR1)
- ...represent the results of weight comparisons. (GR1)
- ...create tallies of information (data) gathered. (GR2)
- ...create graphs of data gathered. (GR2)

Fundamental Knowledge & Skill – D Probability

Students will develop an understanding of probability.

Indicator 1: Students will develop an ability to use chance to draw conclusions and record outcomes of simple events. (MLR-D-1)

SWBAT...

- ...collect and keep track of data. (GR1)
- ...record the outcomes of simple events, such as two color cubes in a bag, through a series of trials. (GR2)
- ...draw conclusions about outcomes/results. (GR2)

Fundamental Knowledge & Skill – E Geometry

Students will develop an understanding of geometric properties, structures, and models for problem-solving.

Indicator 1: Students will develop an ability to explain and work competently with geometrical properties and relationships to solve problems in both practical and theoretical situations. (MLR-E-1)

SWBAT...

- ... identify half an object or drawing or collection. (K)
- ... recognize simple symmetry. (K)

- ...observe, describe, and compare shapes. (GR1)
- ...use mathematical vocabulary to describe and name shapes. (GR1)
- ...describe characteristics of triangles. (GR1)
- ...group shapes according to common characteristics. (GR1)
- ...point out relationships among shapes. (GR1)
- ... demonstrate familiarity with a variety of squares, rectangles, and triangles. (GR1)
- ...visualize and represent shapes (circle, oval, rhombus, parallelogram, triangle, hexagon, rectangle, square; cube, sphere, cylinder). (GR1)
- ...construct, observe, describe, and compare shapes and objects. (GR1)
- ...use mathematical vocabulary to describe shapes. (GR1)
- ...compare and describe objects by size, shape and orientation. (GR1)
- ...identify and describe attributes of various materials. (GR1)
- ...describe, model, and classify the following 2D and 3D figures: cone, sphere, cube, cylinder, triangular prism. (GR2)
- ...use mathematical vocabulary to describe shapes and their properties. (GR2)

Indicator 2: Students will develop an ability to use tools (including language) such as compasses, calculators, computers, etc, in geometrical applications. (MLR-E-2)

SWBAT...

- ... identify certain characteristics of shapes (2 dimensional): square, triangle, circle, rectangle, oval, rhombus, parallelogram, hexagon and all pattern block shapes. (K)
- ...compose and decompose shapes. (GR1)
- ...use rotation and reflection to arrange shapes. (GR1)
- ...fill a given region with shapes. (GR1)
- ...combine 2D shapes. (GR2)
- ...divide 2D shapes. (GR2)
- ...change 2D shapes. (GR2)
- ...shapes by sliding, flipping, and/or rotating them with each other. (GR2)
- ...describe new shapes create by altering 2D shapes. (GR2)

Indicator 3

Students will develop an ability to analyze the dimensions and properties of shapes, their position in space and their usefulness in practical situations. (MLR-E-3)

SWBAT...

- ...identify, name & draw shapes: triangles, circles, squares, rectangles, stars. (K)
- ...identify practical, everyday objects as the shape they are. (K)
- ...demonstrate an awareness of space. (K)
- ...identify, recognize, name, and draw shapes: heart, diamond, pentagon, hexagon. (K)
- ...identify, recognize, name: cube, cylinder, cone as three-dimensional. (K)
- ...compare and describe objects by size, shape, and orientation. (GR1)
- ...demonstrate that shapes (putting them together and taking them apart) make patterns. (GR1)
- ...use positional words to describe the relationship of two or more objects (next to, horizontal, vertical, diagonal). (GR1)

- ...use the vocabulary of spatial sense: INSIDE, BETWEEN, ABOVE, BELOW, BEHIND. (GR1)
- ...use positional words to describe the relationship of two or more objects (next to, horizontal, vertical, diagonal). (GR2)
- ...begin to recognize the following terms: CONGRUENCE, INCONGRUENCE, SYMMETRY, ANGLE (RT), PARALLEL, PERPENDICULAR, VERTICAL, HORIZONTAL, DIAGONAL. (GR2)
- ...demonstrate the usefulness of geometric shapes to represent real life situations. (GR2)

Fundamental Knowledge & Skill – F Measurement

Students will develop an understanding of measurement, including conversion and instruments for taking measurements.

Indicator 1: Students will develop an ability to use nonstandard and standard units of measurement and conversion of standard units of measurement. (MLR-F-1)

SWBAT...

- ...recite the days of the week. (PreK)
- ...recite the daily schedule. (PreK)
- ...begin to use correctly to identify TOMORROW, TODAY, YESTERDAY. (PreK)
- ...recognize length as an attribute of an object. (K)
- ...measure objects with nonstandard units by comparing in practical situations (e.g., a table is 4 hands long) using vocabulary like LONGER, SHORTER, BIGGER, SMALLER, TALLER, HEAVIER, LIGHTER. (K)
- ...measure objects with nonstandard units: HEAVY, LIGHT, BIG, BIGGER, BIGGEST, SMALL, SMALLER, SMALLEST, TALL, SHORT. (K)
- ...measure simple volume (e.g., using the rice tub). (K)
- ...compare two quantities up to 10 and can identify which quantity is more and which is less. (K)
- ...use a calendar to tell days of the week, months of the year, and dates. (GR1)
- ...demonstrate knowledge of the words: before, after, next, then, and last as they apply to a calendar. (GR1)
- ...estimate and measure length using a consistent unit (e.g., cubes, ruler, meter stick). (GR2)
- ...estimate and tell exact time to the half, quarter hour. (GR2)
- ...tell time in one hour and half-hour intervals beginning on the hour. (GR2)
- ...record start/stop times in both analog and digital times. (GR2)
- ...tell time in five-minute intervals. (GR2)
- ...read a digital clock to the minute. (GR2)
- ...estimate and then read temperatures on a thermometer. (Fahrenheit; Introduction to Celsius.) (GR2)
- ...estimate the weight of an object and then check the estimate using a consistent unit (cubes) on the balance scale. (GR2)
- ...estimate the capacity of containers and then check the capacity using a consistent measure (e.g., rice). (GR2)

Indicator 2: Students will develop an ability to identify values of coins. (MLR-F-2)

SWBAT...

- ...identify different coins: penny, nickel, dime, and quarter. **(K)**
- ...identify coin names, and beginning to identify values, and equivalences (penny, nickel, dime, quarter, combinations up to and including 25, 50, 75, 100). **(GR1)**
- ...identify a half dollar and state its value as being fifty cents. **(GR2)**
- ...identify a dollar bill and state its value as one dollar. **(GR2)**
- ...identify the values of pennies, nickels, dimes, and quarters separately and in groups of coins. **(GR2)**
- ...make combinations of coins to equal the value of one coin (e.g., five pennies to equal one nickel, etc.) **(GR2)**
- ...use coins to model the addition and subtraction multiples of five (nickels) and ten (dimes) to make sums of one dollar. **(GR2)**

Indicator 3: Students will develop an ability to choose standard and nonstandard measurement tools for determining length, time, temperature, weight, capacity and to solve real life problems. **(MLR-F-3)**

SWBAT...

- ...recognize ways things are similar and different. **(PreK)**
- ...use vocabulary to describe similarities and differences (BIGGER, SMALLER, FATTER, LONGER, SHORTER, TALLER). **(PreK)**
- ...identify instruments for measuring time (clocks, etc). **(K)**
- ...use language to describe and compare amounts (LESS, LEAST, MORE, MOST, SAME, EQUAL) . **(K)**
- ...use simple balance to determine weight. **(K)**
- ...use nonstandard weights (e.g., teddy bears, elephants, paperclips, etc.). **(K)**
- ...use various instruments to measure time: clocks: times to the hour; calendar to determine days of the week, months of the year. **(K)**
- ...orally says the days of the week in sequence. **(K)**
- ...use a calendar to determine days of the week and months of the year. **(GR1)**
- ...name the days of the week and months of the year. **(GR1)**
- ...use a clock (digital/analog) to tell time (hour, ½ hour). **(GR1)**
- ...use a clock to tell time to the quarter hour. **(GR2)**
- ...use language to describe and compare capacities. **(GR1)**.
- ...compare capacities. **(GR1)**
- ...estimate the number of units needed to fill a container. **(GR1)**
- ...relate size and shape to capacity. **(GR1)**
- ...compare capacities of more than two containers. **(GR1)**
- ...compare capacities of two containers by filling them with continuous substances (water) or discrete objects (cubes). **(GR1)**
- ...use language to describe and compare lengths and weights. **(GR1)**
- ...demonstrate a sense of heavy and light by feel. **(GR1)**
- ...use a balance to weigh objects. **(GR1)**
- ...use direct comparisons of length. **(GR1)**
- ...measure and compare lengths using standard and nonstandard units. **(GR1)**
- ...orders lengths. **(GR1)**

Fundamental Knowledge & Skill – G Patterns, Relations, Functions

Students will develop an understanding of mathematics as a science which is made up of patterns, relationships and functions.

Indicator 1: Students will develop an ability to recognize and use patterns in a variety of ways.

(MLR-G-1)

SWBAT...

...using trial and error, arrange items along a continuum according to two or more physical features.

(PreK)

...create complex patterns of their own design or by copying. **(PreK)**

...observe and describe attributes of objects and sets of objects, such as color, size, shape, and quantity. **(K)**

...recognize and describe a repeating pattern. **(K)**

...discriminate between a pattern and a random arrangement or design. **(K)**

...decide which attribute to focus on when constructing a pattern. **(K)**

...copy, construct, and extend patterns, such as a-b, a-a-b-b, and a-a-b. **(K)**

...record a pattern. **(K)**

...create a set of a given size, using from 5-12 objects. **(K)**

...predict and verify what comes next in a pattern. **(K)**

...begin to identify and construct the unit of a pattern (i.e., the element that repeats). **(K)**

...begin to decompose patterns into their units. **(K)**

...add units to continue a pattern. **(K)**

...make, describe and extend repeating patterns using a variety of materials. **(GR1)**

...identify, describe, create, and extend repeating patterns. **(GR1)**

...represent a pattern in different ways (actions, drawings, etc). **(GR1)**

...recognize a variety of patterns (color, shapes, and numbers up to four variables). **(GR2)**

...describe patterns. **(GR2)**

...copy, create and extend patterns. **(GR2)**

Indicator 2: Students will develop an ability to describe relationships using variables and open sentences. **(MLR-G-2)**

SWBAT:

...begin to make and compare patterns that use the same unit structure (i.e., recognize similarities among several different kinds of a- patterns). **(K)**

...construct and extend patterns that grow (or shrink) in predictable ways. **(K)**

...define a “rule” for how a pattern grows (or shrinks). **(K)**

...create, represent, and interpret patterns of physical movements, such as hopping or jumping. **(K)**

...counts and compares quantities in two different sets (e.g., number of students). **(K)**

...begin to identify unknowns as x . **(GR1)**

...identify variables (ex: $\underline{\quad} + \underline{3} = \underline{\quad}$). **(GR2)**

...create open sentences. **(GR2)**

...use variables and open sentences to describe relationships. **(GR2)**

Indicator 3: Students will develop an ability to represent and describe geometric and numeric relationships. (MLR-G-3)

SWBAT...

- ...construct a linear pattern in a rectangular frame. (K)
- ...develop meaning for counting by 2's. (GR1)
- ...identify some patterns in the number sequence and on the 100's chart. (GR1)
- ...use variables and open sentences to represent and describe relationships. (GR2)
- ...use pattern blocks to represent and describe geometric relationships. (GR2)

Fundamental Knowledge & Skill – H Algebra

Students will develop an understanding of the concepts involved in Algebra and how they can be applied to problem-solving, real and theoretical.

Indicator 1: Students will develop an ability to graphically depict problems and mathematical expressions that contain an unknown variable using various approaches and different tools. (MLR-H-1)

SWBAT...

- ...keep track of the size of a growing collection of objects. (K)
- ...find and record different ways to arrange a set of 6 objects. (K)
- ...develop methods for recording numerical information (e.g., pictures, words, and/or numerals). (K)
- ...solves story problems involving addition using direct modeling, counting up/down, and numerical relationships. (GR1)
- ...solves story problems involving subtraction using direct modeling, counting up/down, and numerical relationships. (GR1)
- ...determine what a story problem (word problem) is asking. (GR2)
- ...identify the unknown. (GR2)
- ...select an appropriate solution strategy. (GR2)
- ...describe in words their method of solving the problem. (GR2)
- ...describe the problem and solution using drawings. (GR2)

Indicator 2: Students will develop an ability to use appropriate language and symbols to express numerical and other mathematical relationships. (MLR-H-2)

SWBAT...

- ...accurately use the words ADDEND, SUM, UNKNOWN VARIABLE. (GR1)
- ...use numerals to record how many for quantities up to 40. (GR1)
- ...record problem-solving strategies using pictures, numbers, words, and equations. (GR1)
- ...solve story problems involving addition using direct modeling and counting up/down. (GR1)
- ...solves story problems involving subtraction using direct modeling, counting up/down, and numerical relationships. (GR1)
- ...record solutions with pictures, numbers, words, and equations. (GR1)
- ...define and identify *addend*. (GR2)
- ...define and identify *sum*. (GR2)
- ...define and identify *difference*. (GR2)

...define and identify *unknown variable* as a term in itself and as the factor in the problem. (GR2)

Fundamental Knowledge & Skill – I Discrete Mathematics
Students will develop an understanding of discrete mathematics.

Indicator 1: Students will develop an ability to classify objects into groups based on their attributes. (MLR-I-1)

SWBAT...

- ...sort objects into groups and subgroups and tell why. (PreK)
- ...identify the following materials and their attributes: color tiles, pattern blocks, Geoblocks, and interlocking cubes. (K)
- ...have a strategy for accurately counting up to 20 objects. (K)
- ...recognize situations of 1-1 correspondence. (K)
- ...recognize situations of 2-1 correspondence (e.g., number of eyes, number of people). (K)
- ...identify and describe attributes (e.g., physical, functional) of objects. (K)
- ...identify similarities and differences when comparing objects. (K)
- ...sort a collection of objects according to one attribute. (K)
- ...sort a collections of objects in multiple ways. (K)
- ...use counting to collect data. (K)
- ...describe categories for sorting. (K)
- ...use one attribute as a basis for sorting and categorizing. (GR1)
- ...identifies the common attribute among objects in a set. (GR1)
- ...group objects according to color, shape, and size. (GR2)

Indicator 2: Students will develop an ability to organize information for the purpose of determining possible outcomes or to solve problems. (MLR-I-2)

SWBAT...

- ...create with teacher direction lists to determine outcomes and solve problems. (GR1)
- ...create lists to solve problems. (GR2)
- ...use lists to determine possible outcomes. (GR2)

Fundamental Knowledge & Skill – J Mathematical Reasoning
Students will develop an understanding of logical reasoning in mathematics.

Indicator 1: Students will develop an ability to differentiate between strengths and weaknesses in a simple argument. (MLR-J-1)

SWBAT...

- ...identify important and not important information in a story problem. (GR1)
- ...tell why an argument is a good one and why it is not a good one. (GR1)
- ...determine what a story problem is asking for. (GR2)
- ...select an appropriate solution strategy for a story problem. (GR2)

...clearly explain orally and in writing their thinking behind the strategies employed. (GR2)

Indicator 2: Students will develop an ability to distinguish between essential and nonessential problem information. (MLR-J-2)

SWBAT...

...use findings to discuss relationships among units in the problem. (GR2)

...decide which units will work most effectively with certain measurement tasks. (GR2)

Fundamental Knowledge & Skill – K Mathematical Communication

Students will develop an understanding of how they can best interpret mathematical ideas and relationships

Indicator 1: Students will develop an ability to use numbers and symbols to express data and relationships. (MLR-K-1)

SWBAT...

...record problem-solving strategies with pictures, numbers, words, and equations. (GR1)

...solve story problems involving addition using direct modeling and counting up/down. (GR1)

...use equations to describe arrangements of objects or pictures in groups. (GR1)

...record solutions with pictures, numbers, words, and equations. (GR1)

...identify and use correctly: $<$ $>$ $+$ $-$ $=$ x , y as variables. (GR1,2)

...identify and write numerals from 0-200. (GR2)

MSAD #53 Curriculum: Math GR 3-4***Fundamental Knowledge & Skill – A Numbers & Number Sense***

Students will develop an understanding of numbers – what they mean and how they are used in everyday life.

Indicator 1: Students will develop an ability to work effectively with whole numbers up to one million. (MLR-A-1)

SWBAT...

- ...round numbers to nearest thousand. (GR3)
- ...round to nearest dollar. (GR3)
- ...read place value to thousands. (GR3)
- ...compare whole numbers to one thousand. (GR3)
- ...identify odd and even numbers to 1,000. (GR3)
- ...compare number in terms of greater than, less than, equal to up to 1,000. (GR3)
- ...read place value to millions. (GR4)
- ...round to nearest million. (GR4)
- ...compare whole numbers up to one million. (GR4)
- ...round to nearest ten dollars. (GR4)

Indicator 2: Students will develop an ability to work effectively with simple fractions up to and including tenths. (MLR-A-2)

SWBAT...

- ...demonstrate that fractions are equal parts of a whole. (GR3)
- ...name and write fractional parts of a whole. (GR3)
- ...compare fractions in terms of equal to ($=$), greater than ($>$), and less than ($<$). (GR3,4)
- ...demonstrate equivalent fractions. (GR4)
- ...begin to reduce fractions to lowest terms. (GR4)
- ...begin to use mixed numbers. (GR4)
- ...add and subtract fractions with like-denominators. (GR4)

Indicator 3: Students will develop an ability to work effectively with decimals and integers. (MLR-A-3)

SWBAT...

- ...add and subtract decimals to the hundredths. (GR 3)
- ...compare and order decimals to the hundredths. (GR 3)
- ...add and subtract decimals. (GR4)
- ...begin to compare and order decimals to the hundredths. (GR4)
- ...show equivalency of decimals and fractions (tenth, half, quarter, three-quarters). (GR4)

Fundamental Knowledge & Skill – B Computation

Students will develop an understanding of how to use and apply mathematics - the skills involved in mathematical applications, computation, reasoning, problem-solving and decision-making.

Indicator 1: Students will develop an ability to use the four operations with whole numbers to problem-solve real-life problems that require more than one step. **(MLR-B-1)**

SWBAT...

- ...solve single and two step problems with addition, subtraction, and multiplication. **(GR3)**
- ...begin to solve multi-step problems with addition, subtraction, and multiplication. **(GR3)**
- ...add, subtract, multiply – three or more steps. **(GR4)**
- ...divide with two steps. **(GR4)**

Indicator 2: Students will develop an ability to use addition and subtraction of simple fractions to problem-solve real-life problems **(MLR-B-2)**

SWBAT...

- ...add fractions with like denominators. **(GR3)**
- ...subtract fractions with like denominators. **(GR3)**
- ...add mixed numbers and fractions with like denominators. **(GR4)**
- ...subtract mixed numbers and fractions with like denominator. **(GR4)**

Indicator 3: Students will develop an ability to use appropriate math tools and technology to demonstrate and explain problem-solving processes, defending the logic of results. **(MLR-B-3)**

SWBAT...

- ...use a graphic organizer to solve math problems (draw a picture, guess & check, make a table, choose an operation, work backwards, find a pattern, diagram, tally, chart). **(GR3)**
- ...make a table. **(GR4)**
- ...guess and check. **(GR4)**
- ...draw a picture. **(GR4)**
- ...choose an operation. **(GR4)**
- ...work backwards. **(GR4)**
- ...find a pattern. **(GR4)**
- ...diagrams. **(GR4)**
- ...calculator. **(GR4)**

Indicator 4: Students will develop an ability to demonstrate proficiency with facts and algorithms of addition, subtraction, multiplication, and division of whole numbers using mental math as well as a variety of materials, strategies, and technologies. **(MLR-B-4)**

SWBAT...

ADDITION

- ...add whole numbers through thousands with and without renaming **(GR3)**
- ...add numbers, including money, in columns. **(GR3)**
- ...demonstrate fact families with sums up to 20. **(GR3)**
- ...find sums of three addends. **(GR3)**
- ...estimate sums, including money, using rounding. **(GR3)**

...add a column of three or more (2- and 3-digit) numerals. (GR4)

...add 5-digit numerals with and without renaming. (GR4)

...estimate answers. (GR4)

...solve problems and give explanations. (GR4)

SUBTRACTION

...estimate differences through three-digit numbers using rounding. (GR3)

...subtract 3-digit numbers with and without renaming. (GR3)

...check subtraction by adding. (GR3)

...subtract 3-,4-,and 5-digit numerals with and without renaming. (GR4)

...subtract whole three-digit numbers with one or more middle zeros. (GR4)

MULTIPLICATION

...demonstrate mastery of multiplication facts 0-7. (GR3)

...use multiplication correctly in problems. (GR3)

...multiply 2-digit by 1-digit numbers with and without renaming. (GR3)

...demonstrate mastery of multiplication facts 6-10. (GR4)

...multiply 4-digit numerals with and without renaming. (GR4)

...use mental math to find the product of 1-digit numerals multiplied by 10, 100, 1000. (GR4)

...estimate answers. (GR4)

DIVISION

...understand the operation of division when sharing equally (no remainders). (GR3)

...demonstrate mastery of division facts 0-5. (GR3)

...check simple division by multiplying. (GR3)

...demonstrate mastery of division facts 6-10. (GR4)

...understand the operation of division with and without remainders. (GR4)

...divide 2- and 3-digit numerals by 1-digit divisors (with and without 0 in the quotient). (GR4)

...find the average of three or more numerals. (GR4)

...check answers by multiplying. (GR4)

Fundamental Knowledge & Skill – C Data Analysis & Statistics

Students will develop an understanding of how numbers help make meaning of data: the processes of data collection, analysis, interpretation, as well as drawing conclusions from data.

Indicator 1: Students will develop an ability to generalize and make conclusions using a variety of charts, graphs, and tables. (MLR-C-1)

SWBAT...

...read and interpret bar graphs, tables, line graphs, line plots, pictographs, tally charts, and T-charts. (GR3)

...read, interpret, compare, and create pie charts, Venn diagrams, bar graphs, line graphs. (GR4)

...use pie charts, Venn diagrams, bar graphs, line graphs to solve problems and answer questions. (GR4)

Indicator 2: Students will develop an ability to read and interpret displayed data. (MLR-C-2)

SWBAT...

...read and make graphs and tables. (GR4)

...solve real-life problems by making, reading or generalizing graphs and tables. (GR4)

...find and identify least and most frequent data. (GR4)

Fundamental Knowledge & Skill – D Probability

Students will develop an understanding of probability.

Indicator 1: Students will develop an ability to describe how chance can predict outcomes. (MLR-D-1)

SWBAT...

...identify the likelihood of a particular outcome. (GR3)

...use beads to predict 1-100. (GR4)

...use beads to explain why. (GR4)

Indicator 2: Students will develop an ability to estimate the probability of an event from a sample of observed outcomes and simulations. (MLR-D-2)

SWBAT...

...gather data and draw conclusions from the data. (GR3)

...create and solve a simple probability problem. (GR4)

Fundamental Knowledge & Skill – E Geometry

Students will develop an understanding of geometric properties, structures, and models for problem-solving.

Indicator 1: Students will develop an ability to use applicable properties to describe, model and classify shapes and figures. (MLR-E-1)

SWBAT...

...describe, model and classify the following shapes and figures:

polygons. (GR3,4)

segments. (GR3)

points. (GR3)

angles (right, obtuse, acute). (GR3,4)

space figures. (GR3)

plane figures. (GR3,4)

intersecting lines. (GR3)

parallel lines. (GR3)

parallel vs. perpendicular lines. (GR4)

quadrilaterals as squares, rectangles, parallelograms, trapezoids. (GR4)

...give coordinates of a point on a graph. (GR3)

...locate a point on a graph, given coordinates. (GR3)

...explore ordinate geometry. (GR4)

...use a protractor to measure right, obtuse, and acute angles. (GR4)

...determines the number of sides and the number of angles of the various shapes and figures listed above. (GR4)

Indicator 2: Students will develop an ability to generalize about congruency, symmetry, and similarity by experimenting with shapes and figures. (MLR E-2)

SWBAT...

- ...find a line of symmetry. (GR3)
- ...identify whether figures are congruent or non-congruent. (GR3)
- ...draw a symmetrical figure. (GR3)
- ...find symmetry multiple lines. (GR4)
- ...construct congruent and non-congruent shapes and figures. (GR4)

Indicator 3

Students will develop an ability to make effective use of transformations, such as slides, flips, and rotations. (MLR E-3)

SWBAT...

- ...identify figures. (GR3)
- ...draw a figure showing an understanding of slides, flips, and rotation (on an axis). (GR3)
- ...design and demonstrate slides, flips, and rotation patterns of their own. (GR4)

Indicator 4

Students will develop an ability to describe the physical world using the properties of shapes and figures. (MLR E-4)

SWBAT...

- ...describe the classroom and school building in terms of shapes and figures. (GR3)
- ...draw a diagram/floor plan of their house, and identify shapes and figures present in their drawing. (GR3)
- ...identify things in the physical world using the properties of quadrilaterals, cylinders, polygons, and three dimensional figures. (GR4)

Fundamental Knowledge & Skill – F Measurement

Students will develop an understanding of measurement, including conversion and instruments for taking measurements.

Indicator 1: Students will develop an ability to solve and explain their solutions to real-life problems that involve measuring time, length, area, perimeter, weight, temperature, mass, capacity, and volume. (MLR-F-1)SWBAT...

- ...define INCH, FOOT, YARD, CUP, PINT, QUART, GALLON, TEASPOON, TABLESPOON. (GR3)
- ...define METER, CENTIMETER, LITER, AREA, PERIMETER, MASS VOLUME. (GR3)
- ...determine elapsed time. (GR4)
- ...use standard measurement to solve problems. (GR3)
- ...begin to use metric measurement (centimeters, meters) to solve problems. (GR4)
- ...read time in fractional increments (quarter to, quarter past/after, half past) (GR4)

Indicator 2: Students will develop an ability to select appropriate tools and units of measurement to take measurements. (MLR-F-2)

SWBAT...

- ...count change. (GR3)
- ...identify combinations of coins equal to one dollar. (GR3)
- ...estimate the amount of change back. (GR3)

- ...identify bills up to and including \$20.00. (GR4)
- ...count the amount of change back up to and including \$20.00. (GR4)
- ...measure perimeter. (GR3,4)
- ...use standard measurement for temperature, length, weight, time. (GR3,4)
- ...read an analog clock to one-minute intervals. (GR3)
- ...measure area. (GR4)
- ...measure mass. (GR4)
- ...measure volume. (GR4)
- ...convert values to decimals. (GR4)
- ...use decimals in computation of money. (GR3,4)

Fundamental Knowledge & Skill – G Patterns, Relations, Functions

Students will develop an understanding of mathematics as a science which is made up of patterns, relationships and functions.

Indicator 1: Students will develop an ability to solve problems using patterns of numbers, geometry, and a variety of graphs. (MLR-G-1)

SWBAT...

- ...solve problems by making a variety of appropriate graphs. (GR3,4)
- ...choose the best type of graph to display needed information for problem solving. (GR3)
- ...collect and interpret data in graphs. (GR4)
- ...recognize and use patterns of numbers to solve problems. (GR3,4)
- ...complete number patterns to solve problems. (GR4)
- ...explain rules for number patterns used to solve problems. (GR4)

Indicator 2: Students will develop an ability to illustrate and describe relationships using variables and open sentences.. (MLR-G-2)

SWBAT:

- ...illustrate and solve problems for the unknown variable. (GR3)
- ...use a variety of strategies to solve open-sentence problems. (GR4)

Fundamental Knowledge & Skill – H Algebra

Students will develop an understanding of the concepts involved in Algebra and how they can be applied to problem-solving, real and theoretical.

Indicator 1: Students will develop an ability to create and assess formulas for problem-solving. (MLR-H-1)

SWBAT...

...choose correct operational strategies to solve problems. (GR3)

...use more than one formula to solve multi-step problems. (GR4)

Indicator 2: Students will develop an ability to determine replacement variables that could make simple number sentences true. (MLR-H-2)

SWBAT...

...develop a simple problem with one unknown variable. (GR3)

...develop a problem with more than one unknown variable. (GR4)

Fundamental Knowledge & Skill – I Discrete Mathematics
Students will develop an understanding of discrete mathematics.

Indicator 1: Students will develop an ability to design and effectively use lists, tree diagrams, Venn diagrams, and networks.

SWBAT...

...use a variety of graphic organizers. (GR3,4)

Indicator 2: Students will develop an ability to give examples of infinite and finite solutions. (MLR-I-2)

SWBAT...

...define FINITE and INFINITE. (GR3)

...use a calculator to solve problems that have finite and infinite solutions. (GR4)

Fundamental Knowledge & Skill – J Mathematical Reasoning
Students will develop an understanding of logical reasoning in mathematics.

Indicator 1: Students will develop an ability to show their understanding that claims need to be based on various types of evidence (logical processes, measurement, experimentation, etc). (MLR-J-1)

SWBAT...

...explain their method of solution and evidence for their answer when problem solving, i.e. show their work. (GR3,4)

Fundamental Knowledge & Skill – K Mathematical Communication
Students will develop an understanding of how they can best interpret mathematical ideas and relationships.

Indicator 1: Students will develop an ability to communicate ideas and information in presentations, concisely and clearly, using simple tables and graphs. **(MLR-K-1)**

SWBAT...

...make a presentation and/or create a project that exhibits an application of math concepts. **(GR3)**

...provide step-by-step explanation of their solution to problems. **(GR4)**

MSAD #53 Curriculum: Math GR 5-8*Fundamental Knowledge & Skill – A Numbers & Number Sense*

Students will develop an understanding of numbers – what they mean and how they are used in everyday life.

Indicator 1: Students will develop an ability to use numbers in a variety of equivalent and interchangeable forms (e.g., integer, fraction, decimal, percent, exponential, and scientific notation) in problem solving. **(MLR-A1)**

SWBAT...

- ...work effectively with place value from millions to ten-thousands **(GR5)**, and from hundred thousands to billions. **(GR6)**
- ...compare and order decimals, fractions, and integers **(GR5)** and percents. **(GR6)**
- ...apply these concepts (e.g., integers, fractions, decimals, percents, exponentials, and scientific notation) in problem-solving situations. **(GR5,6)**
- ...solve problems using numbers in a variety of forms. **(GR6,7)**
- ...change fractions, decimals, and percents to their equivalents in order to solve problems. **(GR6)**
- ...apply number system, decimals, simple fractions, mixed numbers, and integers. **(GR7,8)**
- ...compare and order integers, fractions, decimals, whole numbers using exponential and scientific notation. **(GR7,8)**

Indicator 2: Students will develop an ability to demonstrate understanding of the relationships among the basic arithmetic operations on different types of numbers. **(MLR-A2)**

SWBAT...

- ...demonstrate an understanding of the order of operations. **(GR5,6)**
- ...apply the order of operations. **(GR6,7,8)**
- ...find the Greatest Common Factor (GCF) and Least Common Multiple (LCM). **(GR5)**
- ...apply the concept of opposite functions. **(GR6)**
- ...apply properties of numbers, such as IDENTITY, COMMUTATIVE, ASSOCIATIVE, DISTRIBUTIVE, ZERO and OPPOSITES. **(GR6,7)**
- ...add, subtract, multiply and divide numbers of different forms (e.g., fractions, decimals, percents). **(GR7,8)**
- ...demonstrate the relationship between addition and subtraction, multiplication and division. **(GR5,6)**

Indicator 3: Students will develop an ability to apply concepts of ratios, proportions, percents, and number theory (e.g., primes, factors, and multiples) in practical and other mathematical situations.

(MLR-A3)**SWBAT...**

- ...identify and explain a PRIME NUMBER. **(GR5)**
- ...find the Greatest Common Factor (GCF) and the Least Common Multiple (LCM). **(GR5)**
- ...solve problems using ratios, proportions, percents, and number theory. **(GR6,7)**
- ...list prime numbers less than 100. **(GR5)**
- ...use the GCF and LCM when reducing, adding, and subtracting fractions. **(GR7)**
- ...illustrate the relationship between factors and multiples using fractions. **(GR7,8)**
- ...recognize prime numbers. **(GR5)**

...demonstrate and communicate the uses for percents. (GR5,6,7)

Indicator 4: Students will develop an ability to represent numerical relationships in graphs, tables, and charts. (MLR-A4)

SWBAT...

...identify, generate, and organize data that can be effectively shown on graphs, tables or charts. (GR6)

...construct neat and organized graphs, tables, and charts. (GR6,7)

...explain mean, median, mode, and range using graphs. (GR7)

Fundamental Knowledge & Skill – B Computation

Students will develop an understanding of how to use and apply mathematics - the skills involved in mathematical applications, computation, reasoning, problem-solving and decision-making.

Indicator 1: Students will develop an ability to compute and model all four operations with whole numbers, fractions, decimals, sets of numbers, and per cents, applying the proper order of operations. (MLR-B1)

SWBAT...

...add and subtract whole numbers and decimals. (GR5,6)

...multiply by 2-digit multipliers (GR5) using whole numbers.

...multiply by 2-digit multipliers (GR6) using decimals.

...divide by 2-digit divisors using whole numbers. (GR,6)

...divide by 2-digit divisors using decimals. (GR6)

...demonstrate the order of operations in solving problems. (GR5)

...add, subtract, multiply and divide fractions and mixed numbers. (GR6)

...convert percents to decimals. (GR6,7)

...convert percents to fractions. (GR6,7)

...compute the percent or fraction of a number. (GR7)

Indicator 2: Students will develop an ability to create, solve, and justify the solution for multi-step, real-life problems including those with ratio and proportion. (MLR-B2)

SWBAT...

...write multi-step, real-life problems. (GR5,6,7)

...explain the processes they used in problem-solving. (GR5,6,7)

...write and explain multi-step, real-life problems using ratio and proportion. (GR7)

Fundamental Knowledge & Skill – C Data Analysis & Statistics

Students will develop an understanding of how numbers help make meaning of data: the processes of data collection, analysis, interpretation, as well as drawing conclusions from data.

Indicator 1: Students will develop an ability to organize and analyze data using mean, median, mode, and range. (MLR-C1)

SWBAT...

...calculate the MEAN, and find the MODE, MEDIAN, and RANGE of a data set. (GR5,6,7)

- ...explain what is represented by mean, mode, median, and range. (GR5,6,7)
- ...graph a data set. (GR5,6,7)
- ...systematically collect, organize, describe, and formulate key questions based on data. (GR5,6)

Indicator 2: Students will develop an ability to assemble data and use matrices to formulate and solve problems. (MLR-C2)

SWBAT...

- ...develop diagrams and/or organized lists from data to solve problems. (GR6,7,8)

Indicator 3: Students will develop an ability to construct inferences and convincing arguments based on data. (MLR-C3)

SWBAT...

- ...present and explain data using graphs and tables. (GR5,6,7)
- ...present convincing arguments using graphic organizers of their data. (GR7,8)
- ...read and use graphs to construct a convincing argument. (GR5,6,7,8)
- ...formulate and ask key questions from the data set. (GR5,6,7)

Fundamental Knowledge & Skill – D Probability
Students will develop an understanding of probability.

Indicator 1: Students will develop an ability to find the probability of simple events and make predictions by applying the theories of probability. (MLR-D1)

SWBAT...

- ...conduct experiments and find the probability of the event occurring. (GR6)
- ...explain the difference between mathematical and actual probability. (GR6)
- ...determine whether a game is fair or unfair. (GR6)
- ...explain how to make an unfair game fair. (GR6)
- ...explain and write probabilities. (GR6)
- ...analyze situations and give probabilities. (GR6)

Indicator 2: Students will develop an ability to explain the idea that probability can be represented as a fraction between and including zero and one. (MLR-D2)

SWBAT...

- ...demonstrate “certain” and “impossible” using 0 and 1. (GR6)
- ...explain probability from a mathematical point of view. (GR6)
- ...describe EXPERIMENTAL vs. THEORETICAL PROBABILITY. (GR6)

Indicator 3: Students will develop an ability to use simulations to estimate probabilities. (MLR-D4)

SWBAT...

- ...use coins, dice spinners, and cards to show and to estimate probability. (GR6)

Indicator 4: Students will develop an ability to find all possible combinations and arrangements involving a limited number of variables. (MLR-D4)

SWBAT...

...construct an organized list to answer questions about possible combinations and arrangements using three or more variables. (GR6)

Fundamental Knowledge & Skill – E Geometry

Students will develop an understanding of geometric properties, structures, and models for problem-solving.

Indicator 1: Students will develop an ability to compare, classify, and draw two-dimensional shapes and three-dimensional figures. (MLR-E1)

SWBAT...

- ...identify, classify different shapes (basic polygons). (GR5)
- ...conduct transformations such a flips, slides, and rotations. (GR5)
- ...distinguish length, width, base, height (e.g., of a square, rectangle, triangle, hexagons, trapezoid, parallelogram, rhomboid, circle). (GR5,6,7)
- ...draw shapes and figures (e.g., squares, rectangles, triangles, hexagons, trapezoids, parallelograms, rhombi, circles). (GR5,6,7)
- ...identify the formula for square area of squares, rectangles, triangles, and circles. (GR6)
- ...recognize the relationship between two- and three-dimensional shapes/figures. (GR5)

Indicator 2: Students will develop an ability to apply geometric properties to represent and solve real-life problems involving regular and irregular shapes. (MLR E2)

SWBAT...

- ...find area, perimeter, (GR6) and volume (GR7) of regular shapes.
- ...develop a plan to calculate the area of irregular shapes. (GR6)
- ...divide irregular shapes into regular polygons. (GR6)

Indicator 3: Students will develop an ability to use a coordinate system to define and locate positions. (MLR E3)

SWBAT...

- ...create and accurately use a system of coordinates. (GR5)
- ...plot points in positive quadrants. (GR5)
- ...use coordinates to plot points in positive and negative quadrants. (GR7)

Indicator 4

Students will develop an ability to use the appropriate geometric tools and measurements to draw and construct two- and three-dimensional figures. (MLR E4)

SWBAT...

- ...create and manipulate two-dimensional shapes to make three-dimensional figures. (GR5,6)
- ...create angles using angle rulers, protractors, and compasses accurately. (GR5,6,7)
- ...create angles and circles using compasses accurately. (GR5,6,7)
- ...create and measure angles using angle rulers and protractors. (GR5,6,7)

Fundamental Knowledge & Skill – F Measurement

Students will develop an understanding of measurement, including conversion and instruments for taking measurements.

Indicator 1: Students will develop an ability to demonstrate the structure and use of systems of measurement. (MLR-F1)

SWBAT...

...solve real-life problems involving the measurement of time, length, area, perimeter, weight, temperature, mass (GR5,6), and capacity, and volume (GR7,8).

...justify solutions to real-life problems involving measurement of time, length, area, temperature, mass (GR5,6), and capacity, and volume (GR7,8).

...estimate and measure length accurately in standard and metric units. (GR5,6)

...estimate and measure weight and volume using the correct metric units. (GR7,8)

...read scales in standard units to the nearest sixteenth. (GR6)

...read scales in metric units to the nearest millimeter. (GR5)

...compare and convert standard to metric measurement and vice-versa. (GR7,8)

...calculate volume and area using both standard and metric systems. (GR7,8)

Indicator 2: Students will develop an ability to develop and use concepts that can be measured directly, or indirectly (e.g., the concept of rate). (MLR-F2)

SWBAT...

...create and solve problems using the concepts of time, length, weight, and temperature. (GR5,6,7)

...create and solve one-step problems using the concepts of distance, area, volume, (GR7) temperature, time and weight. (GR6)

...measure the construction material into a structure with volume (2D-3D). (GR7,8)

...calculate missing measurements. (GR7,8)

...create and solve two-step equations using the concepts of time, rate, volume, and area. (GR7,8)

Indicator 3: Students will develop an ability to demonstrate an understanding of length, area, volume, and the corresponding units, square units, and cubic units of measurement. (MLR-F3)

SWBAT...

...select measuring tools appropriate for what is being measured. (GR5,6,7,8)

...select units of measure appropriate for what is being measured. (GR5,6,7,8)

...accurately measure a variety of lengths, areas (GR6) and volumes (GR7,8).

...calculate length, area (GR6) and volume (GR7,8) using the correct notation.

...solve for length, area (GR6) and volume (GR7,8) using equations with unknowns.

...draw and label area and perimeter (GR6) and volume (GR7,8) of a figure.

Fundamental Knowledge & Skill – G Patterns, Relations, Functions

Students will develop an understanding of mathematics as a science which is made up of patterns, relationships and functions.

Indicator 1: Students will develop an ability to describe and represent relationships with tables, graphs, and equations. (MLR-G1)

SWBAT...

- ...create tables and/or appropriate graphs from different fields of information. (GR5,6)
- ...choose what graph type is appropriate for the given data set. (GR5)
- ...present tables and/or appropriate types of graphs from a variety of fields of information. (GR5,6,7,)
- ...construct histograms, circle graphs, bar graphs, and coordinate graphs. (GR7,8)
- ...compare and contrast tables and graphs. (GR7,8)
- ...accurately graph linear equations using whole numbers and fractions. (GR7,8)

Indicator 2: Students will develop an ability to analyze relationships to explain how a change in one quantity can result in a change in another. (MLR-G2)

SWBAT...

- ...use simple equations with one variable to see how a change in a variable affects the outcome. (GR6,7)
- ...write simple equations. (GR7)
- ...demonstrate that a change in one dimension will change the total area (GR6), perimeter (GR6), and/or volume (GR7).
- ...use word problems to write equations to show a change in quantity. (GR7,8)

Indicator 3: Students will develop an ability to use patterns and multiple representations to solve problems. (MLR-G3)

SWBAT...

- ...use patterns, relationships, simple equations, to solve problems (GR5,6,7,8)
- ...develop a pattern using geometric shapes. (GR7,8)
- ...use a graph theory to develop a pattern and solve a problem. (GR7,8)

Fundamental Knowledge & Skill – H Algebra

Students will develop an understanding of the concepts involved in Algebra and how they can be applied to problem-solving, real and theoretical.

Indicator 1: Students will develop an ability to use the concepts of variables and expressions. (MLR-H1)

SWBAT...

- ...write and solve equations for one- and two-step problems in a practical context. (GR7,8)
- ...write mathematical expressions, given the word phrases, for all four operations. (GR5,6,7,8)
- ...determine the correct operations to use to solve problems. (GR5,6,7,8)
- ...determine when to use a variable. (GR7,8)
- ...identify the meaning of a variable (GR7,8)

Indicator 2: Students will develop an ability to solve linear equations using concrete, informal, and formal methods which apply the order of operations. (MLR-H2)

SWBAT...

- ...solve simple one-step variable equations. (GR5)
- ...describe what is meant by VARIABLE. (GR7)
- ...recognize a linear equation. (GR7,8)
- ...construct a table to solve for x and/or y . (GR7,8)
- ...solve a linear equation by choosing a value for x and solving for y . (GR7,8)

Indicator 3: Students will develop an ability to analyze tables and graphs to identify properties and relationships in a practical context. (MLR-H3)

SWBAT...

...use a multiple line graph to locate the intersection of two lines. (GR7,8)

...find the intersection-using x and y . (GR7,8)

Indicator 4: Students will develop an ability to use graphs to represent two-variable equations. (MLR-H4)

SWBAT...

...write an equation using a graph. (GR7,8)

...plot points on a graph using a table for x and y . (GR7,8)

Indicator 5: Students will develop an ability to demonstrate an understanding of inequalities and nonlinear equations. (MLR-H5)

SWBAT...

...write inequalities after reading a word phrase. (GR8)

...change to inequalities in real life sentences (e.g., You must weigh at least 100 lb.) (GR8)

...demonstrate graphing inequalities. (GR8)

Indicator 6: Students will develop an ability to find solutions for unknown quantities in linear equations and in simple equations and inequalities. (MLR-H6)

SWBAT...

...make presentations using tables, graphs, and statistics to support arguments. (GR8)

Fundamental Knowledge & Skill – I Discrete Mathematics
Students will develop an understanding of discrete mathematics.

Indicator 1: Students will develop an ability to create and use networks to explain practical situations or solve problems. (MLR-I1)

SWBAT...

...create and use networks to explain practical situations or solve problems. (GR6,7,8)

...demonstrate the use of graphs to determine distances one-way and round-trip. (GR7,8)

Indicator 2: Students will develop an ability to identify patterns in the world and express these patterns with rules. (MLR-I2)

SWBAT...

...identify patterns in the world and express these patterns with rules. (GR6,7,8)

...identify real-life situations that represent patterns with rules. (GR7,8)

...explain rules for observable real-life patterns. (GR7,8)

Fundamental Knowledge & Skill – J Mathematical Reasoning
Students will develop an understanding of logical reasoning in mathematics.

Indicator 1: Students will develop an ability to support reasoning by using models, known facts, properties, and relationships. (MLR-J1)

SWBAT...

...develop and apply a variety of increasingly complex strategies to solve problems, with emphasis on multi-step and non-routine problems. (GR5,6,7,8)

...use different types of evidence (use of measurement, observation, experimentation) to support a claim. (GR5,6,7,8)

...solve increasingly complex problems with unknowns. (GR5,6,7,8)

...explain and solve multi-step problems. (GR5,6,7,8)

Indicator 2: Students will develop an ability to demonstrate that multiple paths to a conclusion may exist. (MLR-J2)

SWBAT...

...demonstrate an increasingly sophisticated awareness that there is more than one way to solve a problem. (GR5,6,7,8)

...select appropriate and increasingly sophisticated strategies and apply them to solve problems. (GR6,7,8)

Fundamental Knowledge & Skill – K Mathematical Communication

Students will develop an understanding of how they can best interpret mathematical ideas and relationships.

Indicator 1: Students will develop an ability to translate relationships into algebraic notation. (MLR-K1)

SWBAT...

...write and solve simple algebraic expressions using graphs, tables or word problems. (GR7,8)

...translate information from tables, charts, graphs, and word problems into algebraic equations. (GR7,8)

...solve equations and explain their solutions. (GR7,8)

Indicator 2: Students will develop an ability to use statistics, tables, and graphs to communicate ideas and information in convincing presentations and analyze presentations of others for bias or deceptive presentation. (MLR-K2)

SWBAT...

...present their ideas to peers using statistics, tables and graphs. (GR5,6,7,8)

...evaluate presentations of others for objectivity or deception. (GR7,8)