8th Grade (Pre-Algebra) Monitoring Sheet

Number Sense and Estimation

M.8.1 Classify numbers with the subsets of the real number system (i.e. whole number, integer, rational number, irrational number, real number).	
Specific skill:	
The students can classify numbers with the subsets of the real number system.	

M.8.2 Approximate square root radicals of non-perfect squares by finding the whole numbers it is between.	
Specific skill:	
The students can approximate square root radicals of non-perfect squares by finding the whole numbers it is between.	

M.8.3 Simplify square root numerical radicals (no variables); (i.e. $\sqrt{12} = 2\sqrt{3}$).	
Specific skill:	
The students can simplify square root numerical radicals.	

Computation and Fluency

M.8.4 Refine proficiency and fluency of computing basic fraction, decimal, and integer operations; [ENRICHMENT: Add, subtract, multiply, and divide with negative fractions and with negative decimals].	
Specific skill:	
[a] The students can compute basic fraction operations.	
[b] The students can compute basic decimal operations.	
[c] The students can compute basic integer operations.	
[d] [ENRICHMENT]: The students can add and subtract with negative fractions, expressing answers in simplest form.	
[e] [ENRICHMENT]: The students can multiply and divide with negative fractions, expressing answers in simplest form.	
[f] [ENRICHMENT]: The students can add and subtract with negative decimals, expressing answer either precisely or rounded to the nearest given place value.	
[g] [ENRICHMENT]: The students can multiply and divide with negative decimals, expressing answer either precisely or rounded to the nearest given place value.	

M.8.5 Evaluate variable expressions consisting of grouping symbols, exponents, fraction bars, absolute values, negative signs, and/or square roots given integers as the known values of each variable by applying the order of operations and the Properties of Real Numbers.	
Specific skill:	
The students can evaluate variable expressions consisting of grouping symbols, exponents, fraction bars, absolute values, negative signs, and/or square roots given integers as the known values of each variable by applying the order of operations and the Properties of Real Numbers.	

M.8.6 Solve practical problems involving percents (i.e. consumer math; percent of change), using a variety of problem solving strategies (with an emphasis on writing equations to model real life contexts).	
Specific skill:	
[a] The students can find the percent of a number (ex. sales tax, tip, discount, markup).	
[b] The students can find what percent one number is of another.	
[c] The students can find a number when the percent is known.	
[d] The students can find and apply the percent change.	
[e] The students can find and apply unit price.	

M.8.7 Add, subtract, multiply, and divide numbers written in scientific notation, expressing answer in scientific notation.	
Specific skill:	
[a] The students can add and subtract numbers written in scientific notation, expressing answer in scientific notation.	
[b] The students can multiply numbers written in scientific notation, expressing answer in scientific notation.	
[c] The students can divide numbers written in scientific notation, expressing answer in scientific notation.	

Measurement

M.8.8 Solve real world context problems involving unit conversion within or between customary and metric systems and/or estimation of measurements (length/distance, mass/weight, capacity/volume, area, surface area, temperature, time, angle, rates).	
Specific skill:	
[a] The students can solve real world context problems involving unit conversion within the customary system.	
[b] The students can solve real world context problems involving unit conversion within the metric system.	
[c] The students can solve real world context problems involving estimation of measurements (length/distance, mass/weight, capacity/volume, area, surface area, temperature, time, angle, rates).	

M.8.9 Find, justify, and apply reasonable direct and indirect measurements of an object or event using measuring tools, formulas, and/or proportional reasoning.	
Specific skill:	
[a] The students can calculate the approximate perimeter of a tangible object using measurement tools to find and apply its dimensions.	
[b] The students can calculate the approximate area of a tangible object using measurement tools and formulas to find and apply its dimensions.	
[c] The students can calculate the approximate surface area of a tangible object using measurement tools and formulas to find and apply its dimensions.	
[d] The students can calculate the approximate volume of a tangible object using measurement tools and formulas to find and apply its dimensions.	
[e] The students can calculate the approximate heights of tall objects using indirect measurement using shadows or mirrors.	
[f] The student can calculate the approximate time it would take to walk a given distance.	

Geometry

M.8.10 Use the Pythagorean Theorem to solve for missing side lengths of a right triangle, written in either simplest radical form or rounded to the nearest given place value; (ex. finding the distance between any two points on the coordinate plane, converting between its height and slant height of a pyramid or cone).	
Specific skill:	
[a] The students can use the Pythagorean Theorem to solve for missing side lengths of a right triangle, written in either simplest radical form or rounded to the nearest given place value	
[b] The students can use the Pythagorean Theorem to find the distance between any two points on the coordinate plane, written in either simplest radical form or rounded to the nearest given place value.	
[c] The students can find the surface area or volume of a cone or pyramid by using the Pythagorean Theorem to convert between its height and slant height.	

M.8.11 Determine or apply coordinate notation to describe or graph a transformation of ordered pairs or polygons on the coordinate plane {i.e. translations; reflections over the x-axis and y-axis; 90 or 180 rotations with center (0, 0); dilations of positive scale factors with center (0, 0)}.	
Specific skill:	
[a] The students can determine coordinate notation to describe a translation.	
[b] The students can determine coordinate notation to graph a translation.	
[c] The students can determine coordinate notation to describe a reflection over the x-axis and y-axis.	
[d] The students can determine coordinate notation to graph a reflection over the x-axis and y-axis.	
[e] The students can determine coordinate notation to describe 90 or 180 degree rotations with center (0,0).	
[f] The students can determine coordinate notation to graph 90 or 180 degree rotations with center (0,0).	
[g] The students can determine dilations of positive scale factors with center (0,0).	
[h] The students can graph dilations with center (0,0).	

M.8.12 Classify regular polygons and determine their individual angle measurements and sum of angle measurements, with an emphasis on investigating and applying the formulas to find measurement of any polygon's angle or sum of angle measurements [i.e. 180(n-2)/n or 180(n-2)].	
Specific skill:	
[a] The students can classify regular polygons.	
[b] The students can determine individual angle measurements of regular polygons using formulas.	
[c] The students can determine the sum of angle measurements of polygons using formulas.	
[d] [ENRICHMENT] The students can derive the sum of the angle formulas {i.e. 180(n-2)/n or 180(n-2) } by dividing polygons into triangles using diagonals.	
[e] [ENRICHMENT] The students can find the area of a regular polygon given its apothem and side length.	

M.8.13 Identify and construct a three-dimensional model, given the top, side, and front views; sketch top, side, and front views of a given three-dimensional object.	
Specific skill:	
[a] The students can identify three-dimensional models when given the top, side and front views.	
[b] The students can construct three-dimensional models when given the top, side and front views.	
[c] The students can sketch top, side and front views of a given three-dimensional object.	

M.8.14 Find the surface area of prisms, cylinders, spheres, pyramids and cones, and compound figures using nets and/or calculating the sum of the area of the faces (approximating for π (pi) or writing π (pi) notation as necessary) *	
Specific skill:	
[a] The students can find the surface area of prisms.	
[b] The students can find the surface area of cylinders, approximating for π (pi) or writing in π (pi) notation as necessary.	
[c] The students can find the surface area of spheres, approximating for π (pi) or writing in π (pi) notation as necessary.	
[d] The students can find the surface area of pyramids, approximating for π (pi) or writing in π (pi) notation as necessary.	
[e] The students can find the surface area of cones, approximating for π (pi) or writing in π (pi) notation as necessary.	
[f] The students can find the surface area of compound figures.	

M.8.15 Find the volume of prisms, cylinders, spheres, pyramids and cones, and compound figures [approximating for π (pi)].*	
Specific skill:	
[a] The students can find the volume of prisms.	
[b] The students can find the volume of cylinders, approximating for π (pi) or writing in π (pi) notation as necessary.	
[c] The students can find the volume of spheres, approximating for π (pi) or writing in π (pi) notation as necessary.	
[d] The students can find the volume of pyramids, approximating for π (pi) or writing in π (pi) notation as necessary.	
[e] The students can find the volume of cones, approximating for π (pi) or writing in π (pi) notation as necessary.	
[f] The students can find the volume of compound figures.	

N.B. Calculators and formula sheets can be used at discretion of the teacher, but note that neither can be used by students on exemption exams. OCS recommends that calculators and formula sheets only be used as a supplement to check work.

Data Analysis and Probability

M.8.16 Identify and find the probability of opposite, mutually exclusive, overlapping, independent and dependent events as fractions and percents.	
Specific skill:	
[a] The students can identify whether multiple events are mutually exclusive or overlapping (or inclusive).	
[b] The students can find the probability of opposite events as fractions and percents.	
[c] The students can find the probability of mutually exclusive events as fractions and percents.	
[d] The students can find the probability of overlapping events as fractions and percents.	
[e] The students can identify whether multiple events are independent or dependent.	
[f] The students can find the probability of independent and dependent events as fractions and percents.	

M.8.17 Determine one or more missing data value(s) from a set of data given its mean, median, mode, and/or range, including real world context; { ex. find the score a student must earn on their next test to earn an A for their total grade }.	
Specific skill:	
The students can determine one or more missing data values from a set of data given its mean, median, mode, and/or range.	

M.8.18 Collect, display, and analyze data in scatter plots on a coordinate plane; {ex. identify its correlation (i.e. positive, negative, none); estimate and sketch the line of best fit }.	
Specific skill:	
The students can collect data and display and analyze it in a scatter plot.	

Patterns, Functions and Algebra

M.8.19 Simplify variable expressions (i.e. add and subtract like terms; multiply monomials or a monomial by a multi-term expression) by applying the Properties of Real Numbers.	
Specific skill:	
[a] The students can simplify variable expressions by adding and subtracting like terms.	
[b] The students can simplify variable expressions by multiplying monomials.	
[c] The students can simplify variable expressions by multiplying a monomial by a multi-term expression.	

M.8.20 Factor variable expressions as products by applying the Distributive Property (with the greatest common factor limited to a whole number); {ex. $8x - 12 = 4(2x - 3)$ }.	
Specific skill:	
The students can use the Distributive Property to factor out a whole number GCF from a variable expression.	

M.8.21 Simplify and write equivalent exponential expressions (both numerical and variable) with integer exponents; [ex. $(12x)/4x^2 \rightarrow 3/x$ or $3x^{-1}$].	
Specific skill:	
The students can simplify and write equivalent exponential expressions with integer exponents.	

M.8.22 Solve simple quadratic and absolute value equations (involving positive rational numbers); (ex: $x^2 = 16 \rightarrow x = -4$ and 4; $\|x\| = 16 \rightarrow x = -16$ & 16).	
Specific skill:	
[a] The students can solve simple quadratic equations.	
[b] The students can solve simple absolute value equations.	

M.8.23 Solve multi-step variable equations (ex. combine like terms; apply distributive property) including ones with variables on both sides of the equation, by applying the Properties of Equality.	
Specific skill:	
[a] The students can solve multi-step variable equations by applying the Distributive Property and the Properties of Equality.	
[b] The students can solve equations with variables on both sides of the equation by applying the Properties of Equality.	

M.8.24 Solve, graph the solution of two-step inequalities with one variable by applying the Properties of Inequality; determine if a number is a solution to the inequality.	
Specific skill:	
[a] The students can solve two-step inequalities with one variable by applying the Properties of Inequality.	
[b] The students can graph the solution of two-step inequalities with one variable by applying the Properties of Inequality.	

M.8.25 Determine if a relation is a function given a set of ordered pairs, table of values, or mapping diagram; find the domain and range of a function.	
Specific skill:	
[a] The students can determine if a relation is a function given a set of ordered pairs.	
[b] The students can determine if a relation is a function given a table.	
[c] The students can determine if a relation is a function given a mapping diagram.	
[d] The students can find the domain and range of a function.	

M.8.26 Classify a variable expression (i.e. polynomial) by its terms (i.e. monomial, binomial, trinomial) and degree (i.e. constant, linear, quadratic).	
Specific skill:	
The students can classify a variable expression by its terms and degree.	

M.8.27 Interpret and find the y-intercept and slope of a line on the coordinate plane, including graphs that represent a real-world context.	
<u>Specific skill:</u>	
The students can find the y-intercept and slope of a line on the coordinate plane.	

M.8.28 Convert the form of linear functions between equations, tables, graphs, and real world context or relationships, with an emphasis on applying slope intercept form (i.e. $y = mx + b$).	
<u>Specific skill:</u>	
The students can convert the form of linear functions between equations, tables, graphs and real-world context.	