Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
Number, Number Sense and Operations Standard Students demonstrate number sense, including an understanding of number systems and operations and how they relate to one another. Students compute fluently and make reasonable estimates using paper and pencil, technology-supported and mental methods.	A. Use scientific notation to express large numbers and numbers less than one. B. Identify subsets of the real number system. C. Apply properties of operations and the real number system, and justify when they hold for a set of numbers. D. Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers. E. Compare, order and determine equivalent forms of real numbers. F. Explain the effects of operations on the magnitude of quantities. G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. H. Find the square root of perfect squares, and approximate the square root of non-perfect squares. I. Estimate, compute and solve problems involving scientific notation, square roots and numbers with integer exponents.	1.Use scientific notation to express large numbers and small numbers between 0 and 1. 2.Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system. 3.Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals. 4.Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations. 5.Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; e.g., very close, less than, greater than. 6.Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
		7.Find the square root of perfect squares, and approximate the square root of non-perfect squares as consecutive integers between which the root lies; e.g., $\sqrt{130}$ is between 11 and 12. 8.Add, subtract, multiply, divide and compare numbers written in scientific notation.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
Measurement Standard Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.	A. Solve increasingly complex non-routine measurement problems and check for reasonableness of results. B. Use formulas to find surface area and volume for specified three-dimensional objects accurate to a specified level of precision. C. Apply indirect measurement techniques, tools and formulas, as appropriate, to find perimeter, circumference and area of circles, triangles, quadrilaterals and composite shapes, and to find volume of prisms, cylinders, and pyramids. D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. F. Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions.	1. Compare and order the relative size of common U.S. customary units and metric units; e.g., mile and kilometer, gallon and liter, pound and kilogram. 2.Use proportional relationships and formulas to convert units from one measurement system to another; e.g., degrees Fahrenheit to degrees Celsius. 3.Use appropriate levels of precision when calculating with measurements. 4.Derive formulas for surface area and volume and justify them using geometric models and common materials. For example, find: a. the surface area of a cylinder as a function of its height and radius; b. that the volume of a pyramid (or cone) is one-third of the volume of a prism (or cylinder) with the same base area and height. 5.Determine surface area for pyramids by analyzing their parts. 6.Solve and determine the reasonableness of the results for problems involving rates and derived measurements, such as velocity and density, using formulas, models and graphs.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
		7.Apply proportional reasoning to solve problems involving indirect measurements or rates. 8.Find the sum of the interior and exterior angles of regular convex polygons with and without measuring the angles with a protractor. 9.Demonstrate understanding of the concepts of perimeter, circumference and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres and cones. (Note: Only volume should be calculated for spheres and cones.) 10. Use conventional formulas to find the surface area and volume of prisms, pyramids and cylinders and the volume of spheres and cones to a specified level of precision.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
Geometry and Spatial Sense Standard Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects, and transformations to analyze mathematical situations and solve problems.	A. Formally define geometric figures. B. Describe and apply the properties of similar and congruent figures; and justify conjectures involving similarity and congruence. C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines. D. Use coordinate geometry to represent and examine the properties of geometric figures. E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology. F. Represent and model transformations in a coordinate plane and describe the results. G. Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system. H. Establish the validity of conjectures about geometric objects, their properties and relationships by counter-example, inductive and deductive reasoning, and critiquing arguments made by others.	1.Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects. 2.Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal. 3.Use proportions in several forms to solve problems involving similar figures (part-to-part, part-to-whole, corresponding sides between figures). 4.Represent and analyze shapes using coordinate geometry; e.g., given three vertices and the type of quadrilateral, find the coordinates of the fourth vertex. 5.Draw the results of translations, reflections, rotations and dilations of objects in the coordinate plane, and determine properties that remain fixed; e.g., lengths of sides remain the same under translations. 6.Draw nets for a variety of prisms, pyramids, cylinders and cones.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
	I. Use right triangle trigonometric relationships to determine lengths and angle measures.	

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
Patterns, Functions and Algebra Standard Students use patterns, relations and functions to model, represent and analyze problem situations that involve variable quantities. Students analyze, model and solve problems using various representations such as tables, graphs and equations.	A. Generalize and explain patterns and sequences in order to find the next term and the *n*th term. B. Identify and classify functions as linear or nonlinear, and contrast their properties using tables, graphs or equations. C. Translate information from one representation (words, table, graph or equation) to another representation of a relation or function. D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. E. Analyze and compare functions and their graphs using attributes, such as rates of change, intercepts and zeros. F. Solve and graph linear equations and inequalities. G. Solve quadratic equations with real roots by graphing, formula and factoring. H. Solve systems of linear equations involving two variables graphically and symbolically. I. Model and solve problem situations involving direct and inverse variation.	1. Relate the various representations of a relationship; i.e., relate a table to graph, description and symbolic form. 2.Generalize patterns and sequences by describing how to find the *n*th term. 3.Identify functions as linear or nonlinear based on information given in a table, graph or equation. 4.Extend the uses of variables to include covariants where *y* depends on *x*. 5.Use physical models to add and subtract monomials and polynomials, and to multiply a polynomial by a monomial. 6.Describe the relationship between the graph of a line and its equation, including being able to explain the meaning of slope as a constant rate of change and *y*-intercept in real-world problems. 7.Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems. 8.Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
	J. Describe and interpret rates of change from graphical and numerical data.	9.Solve linear equations and inequalities graphically, symbolically and using technology. 10. Solve 2 by 2 systems of linear equations graphically and by simple substitution. 11. Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution. 12. Solve simple quadratic equations graphically; e.g., $y = x^2 - 16$. 13. Compute and interpret slope, midpoint and distance given a set of ordered pairs. 14. Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, direct variation vs. inverse variation. 15. Describe and compare how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient of x affects the slope and changing the constant affects the intercepts. 16. Use graphing calculators or computers to analyze change; e.g., interest compounded over time as a nonlinear growth pattern.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
Data Analysis and Probability Standard Students pose questions and collect, organize, represent, interpret and analyze data to answer those questions. Students develop and evaluate inferences, predictions and arguments that are based on data.	A. Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability. B. Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose. C. Compare the characteristics of the mean, median and mode for a given set of data, and explain which measure of center best represents the data. D. Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. E. Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. F. Construct convincing arguments based on analysis of data and interpretation of graphs. G. Describe sampling methods and analyze the effects of method chosen on how well the resulting sample represents the population.	1.Use, create and interpret scatterplots and other types of graphs as appropriate. 2.Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose; e.g., line graph for change over time, circle graph for part-to-whole comparison, scatterplot for relationship between two variants. 3.Differentiate between discrete and continuous data and appropriate ways to represent each. 4. Compare two sets of data using measures of center (mean, mode, median) and measures of spread (range, quartiles, interquartile range, percentiles). 5.Explain the mean's sensitivity to extremes and its use in comparison with the median and mode. 6.Make conjectures about possible relationship in a scatterplot and approximate line of best fit. 7.Identify different ways of selecting samples, such as survey response, random sample, representative sample and convenience sample.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
	H. Use counting techniques, such as permutations and combinations, to determine the total number of options and possible outcomes. I. Design an experiment to test a theoretical probability, and record and explain results. J. Compute probabilities of compound events, independent events, and simple dependent events. K. Make predictions based on theoretical probabilities and experimental results.	8.Describe how the relative size of a sample compared to the target population affects the validity of predictions. 9.Construct convincing arguments based on analysis of data and interpretation of graphs. 10. Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important. 11. Demonstrate an understanding that the probability of either of two disjoint events occurring can be found by adding the probabilities for each and that the probability of one independent event following another can be found by multiplying the probabilities.

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
Mathematical Processes Standard Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques, and communicate mathematical ideas.	A. Formulate a problem or mathematical model in response to a specific need or situation, determine information required solving the problem, choosing method for obtaining this information, and set limits for acceptable solution. B. Apply mathematical knowledge and skills routinely in other content areas and practical situations. C. Recognize and use connections between equivalent representations and related procedures for a mathematical concept; e.g., zero of a function and the x-intercept of the graph of the function, apply proportional thinking when measuring, describing functions, and comparing probabilities. D. Apply reasoning processes and skills to construct logical verifications or counter-examples to test conjectures and to justify and defend algorithms and solutions. E. Use a variety of mathematical representations flexibly and appropriately to organize, record, and communicate mathematical ideas.	

Standard	Benchmark	Indicators
	By the end of the 8 – 10 program, students will . . .	
	F. Use precise mathematical language and notations to represent problem situations and mathematical ideas.	
	G. Write clearly and coherently about mathematical thinking and ideas.	
	H. Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.	