



California Pacific Charter Schools • Community Collaborative Charter Schools

## Grade 8 – Mathematics Common Core State

### Standards Standards for Mathematical Practice – “HOW”

#### My student can:

- make sense of problems, persevere in solving them, and check the reasonableness of answers.
- reason with and flexibly use math symbols, numbers, and operations. construct mathematical arguments (using stated assumptions, definitions, previously established results, and logical progressions) and critique the math reasoning of others.
- recognize math in everyday life and use math to solve real problems.
- use tools (e.g., protractor, calculator) strategically to solve problems and deepen understanding.
- calculate accurately, use precise math definitions and vocabulary, and express math ideas clearly.
- look for and make use of patterns and structure in math.
- discern when calculations are repeated, and look both for general methods and for shortcuts.

### Math Content Standards – “WHAT” The Number System

#### My student can:

- understand that numbers that are not rational are called irrational. 8.NS.1
- understand informally that every number has a decimal expansion. 8.NS.1
- for rational numbers, show that the decimal expansion repeats eventually. 8.NS.1
- convert a decimal expansion that repeats into a rational number. 8.NS.1
- determine rational approximations of irrational numbers. 8.NS.2
- locate irrational numbers approximately on a number line diagram. 8.NS.2
- use approximations to compare the size of the irrational numbers. 8.NS.2
- use approximations of irrational numbers to estimate the value of expressions (e.g.,  $\sqrt{2}$ ,  $\pi$ ). 8.NS.2

## Expressions and Equations

### My student can:

- work with radicals and integer exponents. 8.EE.1-4
- understand and apply the properties (multiplication, division, distributing, negatives) of integer exponents to generate equivalent expressions (e.g.,  $3 \times 3 = 3$   
 $= 1/3$   
 $= 1/27$ ). 8.EE.1
- use square root and cube root symbols to represent solutions to square and cube equations in the form  $x = p$  and  $x = q$ , where  $p$  is a positive rational number. 8.EE.2
- find the square roots of small perfect squares and the cube roots of small perfect cubes. 8.EE.2
- understand that the square roots of all non perfect squares are irrational (e.g.,  $\sqrt{2}$  is irrational). 8.EE.2
- use numbers expressed in the form of a single digit times a whole number raised to a power (scientific notation). 8.EE.3 -number power
- compare numbers in scientific notation and express how many times as much one is than the other. 8.EE.3
- perform operations (+, -, x,  $\Rightarrow$ ) with numbers. 8.EE.4 -, x,  $\Rightarrow$  with num
- use scientific notation & choose appropriate units for measurements of very large or very small quantities. 8.EE.4
- interpret scientific notation that has been generated by technology. 8.EE.4
- understand the connections between proportional relationships, lines, and linear equations. 8.EE.5-6
- graph proportional relationships, identifying the unit rate as the slope; find the slope of a graph. 8.EE.5
- compare two different proportional relationships represented in different ways (e.g., compare a distance-time graph with a distance-time graph with a different speed). 8.EE.5 -time graph with a dista
- use similar triangles to explain why the slope  $m$  is the same between any two points on a non-vertical line in the coordinate plane. -vertical line in the coord
- derive the equation  $y = mx$  for a line through the origin and the equation  $y = mx + b$  for a line intercepting the vertical axis at  $b$ . 8.EE.6 solve linear equations in one variable. 8.EE.7
- give examples of linear equations with one solution, infinitely many solutions, or no solutions. 8.EE.7A
- solve linear equations with rational number coefficients. 8.EE.7B

- use the distributive property and collect like terms to solve linear equations. 8.EE.7B
- analyze and solve pairs of simultaneous linear equations. 8.EE.8
- solve systems of two linear equations in two variables algebraically; estimate solutions by graphing the equations; solve simple cases by inspection (e.g.,  $3x+2y=5$  and  $3x+2y=6$  have no solution because  $3x+2y$  cannot simultaneously be 5 and 6). 8.EE.8B
- solve real equations in two variables. 8.EE.8C

-world and mathematical

## Functions

### My student can:

- define, evaluate, and compare functions. 8.F.1-3
- understand that a function is a rule that assigns to each input exactly one output; the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. 8.F.1
- compare properties of two functions each represented in a different way (algebraically, on a graph, in a table, or by verbal descriptions). 8.F.2
- understand that the equation  $y = mx + b$  defines a linear function whose graph is a straight line. 8.F.3
- give examples of functions that are not linear. 8.F.3
- construct a function to model a linear relationship between two quantities. 8.F.4
- determine the rate of change and initial value of a linear function from a description of a relationship or from two  $(x,y)$  values, including values from a table or a graph. 8.F.4
- describe the functional relationship between two quantities by analyzing a graph. 8.F.5
- create a graph that shows the features of a function that has been described verbally. 8.F.5

## Geometry

### My student can:

- understand congruence and similarity using physical models, transparencies, or geometry software. 8.G.1-5
- understand and verify experimentally the properties of rotations, reflections, and translations 8.G.1
- explain that a two-dimensional figure can be obtained from the first by a sequence of rotations, reflections, or translations. 8.G.2
- describe the effect of dilations, translations, rotations, & reflections on two-dimensional figures using coordinates. 8.G.3
- understand that a two-dimensional figure is similar to the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. 8.G.4

-dimensional figure

two-dimensional figure is similar to

- given two similar two-dimensional figures, the student shows the similarity between them. 8.G.4
- use informal reasoning to establish facts about the angle sum and exterior angle of triangles. 8.G.5
- use arguments to establish facts about the angles created when parallel lines are cut by a transversal. 8.G.5
- use arguments to establish facts about the angle-angle criterion for similarity of triangles. 8.G.5
- understand and apply the Pythagorean Theorem. 8.G.6-8
- explain a proof of the Pythagorean Theorem and its converse. 8.G.6
- apply the Pythagorean Theorem to determine unknown side lengths in right triangles. 8.G.7
- apply the Pythagorean Theorem to find the distance between two points in a coordinate system. 8.G.8
- solve real-world and mathematical problems involving cylinders, cones, and spheres. 8.G.9
- write and use the formulas for the volume of cones, cylinders, and spheres. 8.G.9

## Statistics and Probability

### My student can:

- investigate patterns of association in bivariate data. 8.SP
- make and interpret a scatter plot for bivariate measurement data to investigate patterns of association. 8.SP.1
- describe patterns like clustering, outliers, positive/negative association, and linear & nonlinear association. 8.SP.1
- understand that straight lines are widely used to model relationships between two quantitative variables. 8.SP.2
- find the slope and the y-intercept in linear real-world measurement problems. 8.SP.3
- understand that patterns of association can also be seen in a bivariate categorical data by displaying frequencies and relative frequencies in a two-way table & interpret a two-way table sum. 8.SP.4