STANDARDS

MGSE6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

MGSE6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

MGSE.6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form and for cases in which p, q and x are all nonnegative rational numbers. *qpx=+qpx=*

MGSE.6.EE.8 Write an inequality of the form or to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form or have infinitely many solutions; represent solutions of such inequalities on number line diagrams. *cx< cx>cx< cx<*

Represent and analyze quantitative relationships between dependent and independent variables. MGSE6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another. a. Write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. b. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation* $d = 65t$ *to represent the relationship between distance and time.*

Understand ratio concepts and use ratio reasoning to solve problems.

MGSE.6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems utilizing strategies such as tables of equivalent ratios, tape diagrams (bar models), double number line diagrams, and/or equations.

MGSE.6.RP.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

MGSE.6.RP.3b Solve unit rate problems including those involving unit pricing and constant speed.

MGSE.6.RP.3c Find a percent of a quantity as a rate per 100 (e.g. 30% of a quantity means 30/100 times the quantity); given a percent, solve problems involving finding the whole given a part and the part given the whole.

MGSE.6.RP.3d Given a conversion factor, use ratio reasoning to convert measurement units within one system of measurement and between two systems of measurements (customary and metric); manipulate and transform units appropriately when multiplying or dividing quantities. *For example, given 1 in. = 2.54 cm, how many centimeters are in 6 inches?*

ESSENTIAL QUESTIONS

• How is an equation like a balance? How can the idea of balance help me solve an equation?
• What strategies can I use to help me understand and represent real situations using proportions, equations and inequalities?
• How can I write, interpret and manipulate proportions, equations, and inequalities?
• How can I solve a proportion and an equation?
• How can I tell the difference between an expression, equation and an inequality?
• How are the solutions of equations and inequalities different?
• What does an equal sign mean mathematically?
• How can proportions be used to solve problems?
• How can proportional relationships be described using the equation $y = kx$?
• How can proportional relationships be represented using rules, tables, and graphs?
• How can the graph of $y = kx$ be interpreted for different contexts?
• How does a change in one variable affect the other variable in a given situation?
• Which tells me more about the relationship I am investigating, a table, a graph or a formula?

VOCABULARY

Addition Property of Equality: Adding the same number to each side of an equation produces an equivalent expression.

Constant of proportionality: The constant value of the ratio of two proportional quantities x and y; usually written $y = kx$, where k is the constant of proportionality. In a proportional relationship, $y = kx$, k is the constant of proportionality, which is the value of the ratio between y and x.

Dependent variable- A variable that depends on other factors. For example, a test score could be a dependent variable because it could change depending on several factors such as how much you studied, how much sleep you got the night before you took the test, or even how hungry you were when you took it.

Direct Proportion (Direct Variation): The relation between two quantities whose ratio remains constant. When one variable increases the other increases proportionally: When one variable doubles the other doubles, when one variable triples the other triples, and so on. When A changes by some factor, then B changes by the same factor: $A=kB$, where k is the constant of proportionality.

Division Property of Equality: States that when both sides of an equation are divided by the same number, the remaining expressions are still equal

Equation: A mathematical sentence that contains an equal sign

Independent variable: A variable that stands alone and isn't changed by the other variables you are trying to measure. For example, someone's age might be an independent variable.

Inequality: A mathematical sentence that contains the symbols $>$, $<$, $\geq$, or $\leq$.

Inverse Operation: A mathematical process that combines two or more numbers such that its product or sum equals the identity.

Multiplication Property of Equality: States that when both sides of an equation are multiplied by the same number, the remaining expressions are still equal.

Proportion: An equation which states that two ratios are equal.

Solution: the set of all values which, when substituted for unknowns, make an equation true.

Substitution: the process of replacing a variable in an expression with its actual value.

Equation: A mathematical sentence that contains an equal sign

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Multiplication Property of Equality: States that when both sides of an equation are multiplied by the same number, the remaining expressions are still equal.

Proportion: An equation which states that two ratios are equal.

Solution: the set of all values which, when substituted for unknowns, make an equation true.

Substitution: the process of replacing a variable in an expression with its actual value.

Subtraction Property of Equality: States that when both sides of an equation have the same number subtracted from them, the remaining expressions are still equal.

Term: A number, a variable, or a product of numbers and variables.

Variable: A letter or symbol used to represent a number or quantities that vary.