



Marietta City Schools

District Unit Planner

Everything on the unit planner must be included on the unit curriculum approval statement.

Grade 6 Advanced Studies Mathematics

Unit title	<i>Unit 4- One-Step Equations and Inequalities</i>	MYP year	<i>1</i>	Unit duration (hrs)	<i>25 Hours</i>
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Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GSE Standards

Standards

Reason about and solve one-variable equations and inequalities.

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 $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers

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

Concepts/Skills to be Mastered by Students

- Determine if an equation or inequality is appropriate for a given situation.
- Solve mathematical and real-world problems with equations.
- Represent real-world situations as inequalities.
- Interpret the solutions to equations and inequalities.
- Represent the solutions to inequalities on a number line.
- Analyze the relationship between dependent and independent variables through the use of tables, equations and graphs.

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.
- 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.

Key concept	Related concept(s)	Global context
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Logic A method of reasoning and a system of principles used to build arguments and reach conclusions.	Model, pattern, measurement	Globalization and Sustainability
Statement of inquiry		
Expressions, equations and inequalities communicate real world scenarios through symbols, numbers, and algebraic thinking.		
Inquiry questions		
<p>Factual— How do you identify equations and variables? How do we use substitution to find solutions to equations? How do you write one variable addition and subtraction equations?</p> <p>Conceptual— How are word expressions that are translated into algebraic expressions communicating the same information? What strategies help me to understand and represent real life situations mathematically?</p> <p>Debatable— Why do solutions to real world algebraic problems not always what they seem?</p>		
MYP Objectives	Assessment Tasks	
<i>What specific MYP objectives will be addressed during this unit?</i>	<i>Relationship between summative assessment task(s) and statement of inquiry:</i>	<i>List of common formative and summative assessments.</i>
Criteria C: Communication MGSE.6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers	Assessments will expect students to communicate a real world situation in symbolic format using symbols and numbers. They will have to interpret statements concerning various situations algebraically and communicate it in written format. <u>Write and Solve</u> Unit 4.4 Enrichment activity taken from Savvas. Students work in groups of two to four to interpret a situation, define the variables, and represent the situation in the form of an equation. They will solve the equation to provide the answer. Students will examine the structure of mathematical concepts involving geometry and the principles involved to determine the pattern used in writing and solving the equation. Teachers can expect to formatively assess student mastery over 6th grade standard EE. 7. <i>Heterogeneous grouping will allow all students to be supported during this activity. The goal of this activity is to engage students in strengthening their understanding of how to communicate a situation algebraically. For groups that are struggling, the teacher can be an active participant, modeling the thought process behind the activity.</i>	<u>Formative Assessment(s):</u> CFA <u>Summative Assessment(s):</u> MYP- Equation Enrichment from Saavas - Enrichment activity from Unit 4 lesson 4, Write and Solve Equations Unit 4 One Step Equations and Inequalities Test

Approaches to learning (ATL)

Category: Social

Cluster: Collaboration Skills

Skill Indicator:

Give and receive meaningful feedback.

Category: Thinking

Cluster: Critical Thinking, Creative Thinking & Transfer

Skill Indicator: Use models and simulations to explore complex systems and issues

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
<p>MGSE6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another.</p> <p>a. Write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable.</p> <p>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.</p>	<p><u>Spheros Coding Activity-</u></p> <p>Students will learn how to code the Spheros sphere in various ways in order to investigate the connection between speed (rate), time, and distance. Tasks that are conducted with the Spheros focus on the act of programming the sphere and then relating two of the variables while holding the third variable constant. As students observe the change in one variable, they will make connections to the effect it has on the other variable.</p> <p>Students will understand how a logical reasoning process is necessary for the successful completion of the tasks.</p> <p>Students will also be tasked to code the Spheros Bolts in order to use programming and measurement to navigate a maze autonomously. This relates to their science space standards as they will code the bots through a maze navigating craters on the moon or Mars like the Mars rover is programmed.</p>	<p>Students will be grouped with others to support their understanding. For groups that are struggling, the teacher can be an active participant, modeling the thought process behind the activity. The lessons are scaffolded to allow students to move from beginner level understanding to more advanced levels.</p>

Content Resources

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