(Alg 1) Unit 5: Systems of Linear Equations & Inequalities

Content Area: **Math**
Course(s): **Math**
Time Period: **December**
Length: **3 weeks**
Status: **Published**

Unit Overview

In this unit, students will learn about the following topics:

- Solving systems of linear equations by graphing

- Solving systems of linear equations by substitution

- Solving systems of linear equations by elimination

- Solving systems of linear equations with special solutions (no solution & infinitely many solutions)

- Solving equations by graphing

- Graphing linear inequalities in two variables

- Systems of linear inequalities

Enduring Understandings

SWBAT:

- Solve systems of linear equations by graphing them both in the same coordinate plane

- Determine if an ordered pair is a solution to a system of linear equations

- Solve systems of linear equations utilizing the substitution method

- Solve systems of linear equations utilizing the elimination method

- Solve real-world problems that can be modeled by systems of equations

- Determine when a systems has a special solution, like no solution or infinitely many solutions

- Inspect a graph to determine the number of solutions a system has

- Solve a linear equation in one variable by graphing each side as its own equation

- Graph linear inequalities in one variable

- Determine if an ordered pair is in the solution set of a linear inequality

- Represent the solution set of a system of linear inequalities as a shaded region in a coordinate plane

- Determine if an ordered pair is in the solution set of a system of linear inequalities

Essential Questions

How can we:

- solve a system of linear equations by graphing?
- transform a linear equation to slope-intercept form?
- graph a linear equation using slope and y-intercept?
- graph a linear equation using intercepts?
- determine if an ordered pair is a solution of a system of linear equations?
- solve a system of linear equations utilizing the substitution method?
- solve a linear equation for either x or y?
- model a real-world problem by a system of linear equations?
- interpret a solution of a system of linear equations in the context of a real-world problem?
- solve a system of linear equations utilizing the elimination method?
- add (or subtract) two linear equations to combine them together?
- inspect a graph of a system of equations to determine the number of solutions?
- solve a system of linear equations with a special solution?
- solve a linear equation in one variable by graphing?
- treat a linear equation in one variable like a system of linear equations?
- graph a linear inequality in two variables?
- determine whether an ordered pair is in the solution set of a linear inequality?
- graph systems of linear inequalities to determine the solution (represented as a shaded region on a coordinate plane?
- determine whether an ordered pair is in the solution set of a system of linear inequalities?
- solve real-world problems that can be modeled by linear inequalities, as well as systems of linear inequalities?

Instructional Strategies & Learning Activities

- Guided Practice
- Daily Do Now
- Extra Practice & Puzzle Time (Resources)
- Scavenger Hunts
- Coloring Activities
- Task Cards (Around the World)
- Maze Activities
- Quizizz Online Assignments
- Kahoot! Online Games

- GimKit Online Games

Integration of 21st Century Themes and Skills

9.1.K12.P.2	Attend to financial well-being.
9.1.K12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
9.1.K12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
9.4.8.CT.2	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
9.4.8.CT.3	Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
9.1.8.CP.2	Analyze how spending habits affect one's ability to save.
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

Technology & Design Integration

8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.

TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.8.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.8.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.2.8.D.CS1	Apply the design process.

Interdisciplinary Connections

L.KL.8.2.A	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
L.KL.8.2.B	Gather vocabulary knowledge when selecting a word or phrase important to comprehension or expression.
L.VL.8.3.A	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.VL.8.3.B	Analyze the impact of specific word choices on meaning and tone.
L.VL.8.3.C	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).
L.VL.8.3.D	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
ETS1.B	Developing Possible Solutions
ETS1.C	Optimizing the Design Solution

Differentiation

Definitions of Differentiation Components:

- Content – the specific information that is to be taught in the lesson/unit/course of instruction.
- Process – how the student will acquire the content information.
- Product – how the student will demonstrate understanding of the content.
- Learning Environment – the environment where learning is taking place including physical location and/or student grouping

Differentiation occurring in this unit:

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.
- High-achieving students can complete sudoku puzzles and logic puzzles as extension activities.
- Limit number/difficulty of problems for low-achieving students to demonstrate mastery.
- Narrow down problem choice to core concepts for low-achieving students.
- Leveled group-based activities, determined by formative assessment.

Modifications & Accommodations

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.
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Benchmark Assessments

Schoolwide Benchmark assessments:

- Linkit Benchmarks (Form A in September, Form B in January, Form C in June): Linked to NJSLA standards

Additional Benchmarks used in this unit:

- IXL Diagnostic + continued practice during IXL periods

Formative Assessments

Formative Assessments used in this unit:

- Kahoot! Games

- Quizizz Games

- Homework

- Q & A

- Scavenger Hunts

- Coloring Activities

- Task Cards

- Partner Activities

Summative Assessments

Summative assessments for this unit:

- Chapter Test
- Quizzes

Instructional Materials

1. Big Ideas Math: Math & You 6th Grade Textbook
2. Quizizz
3. Kahoot!
4. Scavenger Hunts
5. Task Cards
6. Coloring Activities
7. GimKit

Standards

A.CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
A.REI.C.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
A.REI.C.6	Solve systems of linear equations algebraically (include using the elimination method) and graphically, focusing on pairs of linear equations in two variables.
A.REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
A.REI.D.12	Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.