



YES Prep North Central
Course: Algebra 1
Instructor:
Year: 2008-2009



Unit 7: Systems of Linear Equations

Table of Contents

Section	Page Number
Big Ideas: Overview of the Unit	
Standards; MYP Objectives; Unit Vocabulary	
Understanding by Design: Enduring Understandings; (Topical) Big Questions; The Unit Essential Question	
International Baccalaureate: Approaches to Learning; Areas of Interaction; IB Learner Profile; Opportunity for Integration	
Assessments: Unit Summative Test; Unit Performance Assessments; Unit Project	
Calendar	
Resources	
IB Guides	

Big Ideas

The driving question for this unit is, “*how do humans interact with their environment?*” Students use systems of equations to better understand real world situations, specifically focusing on the decisions that humans make and their impact on the environments where we live. Students are introduced to writing systems of equations from problem situations and then solve by graphing, elimination, and substitution. Students must understand that a solution to a system of equations is an ordered pair that solves each of the equations. They will understand that graphing by hand does not always give the exact solution. After they have mastered each of the other methods, they need to be able to graph and solve using the calculator. Students should be able to rearrange the equations in slope-intercept form to use their calculators to solve any system. Students will apply their understanding of systems of equations to interpret and make judgments in real world situations throughout the unit and in the final project.



TEKS and YES Standards (or College Board Standards, AP Standards, etc.)		Standards translated into Knowledge and Skills	Knowledge and Skills translated into Daily Lesson Objectives
A.7A	Analyze situations involving linear functions and formulate linear equations or inequalities to solve problems.	<ul style="list-style-type: none"> Solve a literal equation for a variable. Set up and solve an equation in one variable to solve a problem. Solve and graph a linear inequality. Interpret the reasonableness of a solution to a linear equation and inequality. Test and identify the solution to a system of linear equations in 2 variables. Identify the solution to a system of equations from a table. Solve a system of linear equations using the graphing method. Solve a system of linear equations using the substitution method. Solve a system of linear equations using the elimination method. Model real-world situations with systems of linear equations. Predict, find, and justify solutions to application problems. Interpret the solution of a system of linear equations in an application problem. Translate between tables, graphs, equations and verbal descriptions. Use systems of linear equations to think critically and make informed decisions in real world situations. We must have 2 equations to find the values of 2 unknowns. 	SWBAT model real-world situations with systems of 2 equations. SWBAT identify solutions of systems of linear equations in 2 variables SWBAT solve systems of linear equations using tables and graphs. SWBAT solve systems of linear equations by graphing (with calculator). SWBAT interpret the solution to a system of equations in a real-world situation. SWBAT solve systems of linear equations in 2 variables using the substitution method. SWBAT solve systems of linear equations in 2 variables using the elimination method. SWBAT select an appropriate method to solve a system of equations and justify the selection. SWBAT predict, find, and justify solutions to application problems. SWBAT investigate a real-world dilemma and relate it to the Areas of Interaction. SWBAT assess the cost-effectiveness of hybrid vs. standard engines, and determine
A.7B	Investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities.		
A.7C	Interpret and determine the reasonableness of solutions to linear equations and inequalities.		
A.8A	Analyze situations and formulate systems of linear equations in two unknowns to solve problems.		
A.8B	Solve systems of linear equations using [concrete] models, graphs, tables, and algebraic methods.		
A.8C	Interpret and determine the reasonableness of solutions to systems of linear equations		
8.4A	Generate a different representation of data given another representation of data (such as a table, graph, equation or verbal description).		



A.7A	Analyze situations involving linear functions and formulate linear equations or inequalities to solve problems.		the effects of changes in various factors.
A.7B	Investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities.		SWBAT <i>recommend</i> the best type of car to buy, and <i>justify</i> their recommendation with tables, graphs, and equations.
A.7C	Interpret and determine the reasonableness of solutions to linear equations and inequalities.		
A.8A	Analyze situations and formulate systems of linear equations in two unknowns to solve problems.		
A.8B	Solve systems of linear equations using [concrete] models, graphs, tables, and algebraic methods.		
A.8C	Interpret and determine the reasonableness of solutions to systems of linear equations		
8.4A	Generate a different representation of data given another representation of data (such as a table, graph, equation or verbal description).	<ul style="list-style-type: none"> • A 2 by 2 system of equations contains 2 equations with the same 2 variables. • A solution to a system of 2 linear equations is an ordered pair that is a solution to both equations. • A system may have zero solutions, one solution, or infinitely many solutions. • The intersection of 2 lines in a graph is the solution to the system of equations. • We cannot always find the exact solution to a system of linear equations by using the graphing method. 	
8.5A	Predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations		



MYP Objectives (pick 1-3 to focus on in this unit)

- Be able to understand and use a variety of mathematical forms and should have the ability to move confidently between them.
- Communicate mathematical facts, ideas, methods, results and conclusions using appropriate language and symbols.
- Communicate mathematical facts, ideas, methods, results and conclusions using a variety of media and technologies.

Unit Vocabulary

System of Equations Substitution Elimination Solution Intersection

Enduring Understandings

- Humans impact their environments in good and bad ways.
- Decisions that we make impact our environment in ways that we may not realize.
- Systems of equations are used to model situations involving interacting functions with the same variables.
- Systems of equations are useful for making informed choices when presented with more than one option.
- The solution to a system of equations is the ordered pair that satisfies both equations. In real world situations, it is typically the break-even point.
- Most systems of linear equations have exactly one solution.
- Systems of linear equations can have zero solutions (if both functions have the same rate of change) or infinitely many solutions (if the functions are equivalent).

Big Questions

- How do humans interact with their environment?
- How do humans make informed decisions, given multiple options?
- What factors affect our decisions, and how do these factors relate to mathematical models?
- How can systems of linear equations be used to represent real-world situations?
- How do different linear functions with the same variables interact?
- What is the best way to solve a particular system of equations?
- What is the significance of the solution to a system of linear equations?
- How many solutions can a system of linear equations have?

Unit Essential Question

How do humans interact with their environments?



Connections to IB

Approaches to Learning

- Working cooperatively
- Receiving feedback and revising work
- Daily reflection on objective and “Big Question of the Day”

Area of Interaction (Choose One. Which one lens will you use to teach the unit? Why? Refer to AOI guide at end of document as well as subject area guides.

Environments: Students will investigate human impact on climate change. Using systems of equations to draw conclusions and make judgments regarding peoples’ decision to by a hybrid vehicle or not, and considering the impact of various events and policies on peoples’ decisions.

IB Learner Profile (How will you help your students develop one or two of the learner profile traits through this unit?)
***This section is optional.**

Students will develop skills to be good communicators through multiple mathematical representations, verbal and written explanations.

Opportunities for Integration

6th and 7th AH & MST: Explain where you will highlight connections between math and science or history and English;

8th-11th: How will you make a connection to another discipline or to the real world? If you are formally integrating this unit, describe how your class will come together with another class or classes in a project.

Connections are made between all of the core subjects in 8th grade through a project that concludes with an exhibition for the public. “*How do humans interact with their environment*” is the driving question for this project and drives instruction throughout the unit in math, science, social studies, and language arts. In Algebra, students use systems of equations to make judgments regarding the cost-effectiveness of buying a hybrid vehicle, and various factors involved in this decision, as they learn about climate change and limited availability of non-renewable sources of energy in science. In English and social studies, students create an imaginary island where they must make decisions with limited resources, as they read Lord of the Flies and learn about the Lewis and Clark expedition. Connections are made between all content areas through the areas of interaction: specifically, Environments and Human Ingenuity.



Unit Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
<p>Graphing Method SWBAT model real-world situations with systems of 2 equations. SWBAT identify solutions of systems of linear equations in 2 variables SWBAT solve systems of linear equations using tables and graphs.</p>	<p>Graphing Cont'd and Quiz SWBAT model real-world situations with systems of 2 equations. SWBAT solve systems of linear equations by graphing (with calculator). SWBAT interpret the solution to a system of equations in a real-world situation.</p>	<p>Substitution Method SWBAT model real-world situations with systems of 2 equations. SWBAT solve systems of linear equations in 2 variables using the substitution method.</p>	<p>Substitution Method, Cont'd and Quiz SWBAT model real-world situations with systems of 2 equations. SWBAT solve systems of linear equations in 2 variables using the substitution method.</p>	<p>Elimination Method SWBAT model real-world situations with systems of 2 equations. SWBAT solve systems of linear equations in 2 variables using the elimination method.</p>
<p>Elimination Method, Cont'd and Quiz SWBAT model real-world situations with systems of 2 equations. SWBAT solve systems of linear equations in 2 variables using the elimination method.</p>	<p>Solving with all 3 Methods SWBAT use the methods of substitution, elimination, and graphing to <i>solve</i> systems of linear equations in 2 variables. SWBAT select an appropriate method to <i>solve</i> a system of equations and <i>justify</i> the selection.</p>	<p>Cushion Day</p>	<p>Application Problems SWBAT model real world situations with systems of linear equations in 2 variables. SWBAT predict, find, and justify solutions to application problems. SWBAT interpret the solution of system of linear equations in application problems.</p>	<p>Application Problems SWBAT model real world situations with systems of linear equations in 2 variables. SWBAT predict, find, and justify solutions to application problems. SWBAT interpret the solution of system of linear equations in application problems.</p>
<p>Application Problems & Quiz SWBAT model real world situations with systems of linear equations in 2 variables. SWBAT predict, find, and justify solutions to application problems. SWBAT interpret the solution of system of linear equations in application problems.</p>	<p>Hybrid Project SWBAT investigate a real-world dilemma and <i>relate</i> it to the Areas of Interaction.</p>	<p>Hybrid Project SWBAT assess the cost-effectiveness of hybrid vs. standard engines, and <i>determine</i> the effects of changes in various factors. SWBAT recommend the best type of car to buy, and <i>justify</i> their recommendation with tables, graphs, and equations.</p>	<p>Unit 7 Review and Test</p>	



Resources

How will the classroom environment, local environment, and/or the community be used to facilitate students' experiences?
How will I incorporate international mindedness throughout the unit?
What resources do I need to teach this unit and to differentiate my lessons?

Holt Algebra 1, Chapter 7
Laying the Foundation: Connecting Algebra 1 to Advanced Placement Mathematics
Dana Center Algebra 1 Assessments

