**Unit Abstract:**

Students will formulate, analyze, and solve pairs of simultaneous equations by using graphs. Students will apply their understanding of systems of equations to interpret and make judgments about real-world situations.

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| **Overarching Question:**  How can we better understand real-world situations by solving systems of linear equations? | | | | | | |
|  | | **This Unit:** formulate and analyze simultaneous linear equations, interpret the solution of a system of linear equations in an application problem | | | |  |
| **Questions to Focus Assessment and Instruction:**  How do you solve a system of equations using a graphing method?  What is the significance of the point of intersection of linear equations?  How many solutions can a system of linear equations have?  What is the significance of the solution to a system of linear equations? | | | | **Standards for Mathematical Practice**  **1.Make sense of problems and persevere in solving them.**  **2.Reason abstractly and quantitatively.**  3.Construct viable arguments and critique the reasoning of others.  **4.Model with mathematics.**  5.Use appropriate tools strategically.  6.Attend to precision.  7.Look for and make use of structure.  8.Look for and express regularity in repeated reasoning. | | |
| **Academic Vocabulary**  *(5-8 most important content specific vocabulary words)* | Systems of equations  Point of intersection  Solution  -Infinite solutions  -One solution  -No solution | |  | |  | |

| **Standards** | **Learning Targets** *(including relevant practice standards)* | **Explanations and Examples\*** | **Assured Experiences**  *(common assessments and learning activities)* |
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| **8.EE.8. Analyze and solve pairs of simultaneous linear equations.**  **a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.**  **b. Solve systems of two linear equations in two variables ~~algebraically~~ solve through graph and check (no substitution, no elimination, no linear combination), and estimate solutions by graphing the equations. Solve simple cases by inspection. *~~For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.~~***  **c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*** | Students will….  identify solutions of systems of linear equations in 2 variables  solve systems of linear equations using tables and/or graphs  interpret the solution to a system of equations in a real-world situation.  model real-world situations with systems of two equations. | **8.EE.8.** Systems of linear equations can also have one solution, infinitely many solutions or no solutions. Students will discover these cases as they graph systems of linear equations ~~and solve them algebraically~~.  A system of linear equations whose graphs meet at one point (intersecting lines) has only one solution, the ordered pair representing the point of intersection. A system of linear equations whose graphs do not meet (parallel lines) has no solutions and the slopes of these lines are the same. A system of linear equations whose graphs are coincident (the same line) has infinitely many solutions, the set of ordered pairs representing all the points on the line.  ~~By making connections between algebraic and graphical solutions and the context of the system of linear equations, students are able to make sense of their solutions. Students need opportunities to work with equations and context that include whole number and/or decimals/fractions.~~  ~~Examples~~: Example:  • ~~Find x and y using elimination and then using substitution.~~  ~~3~~*~~x~~* ~~+ 4~~*~~y~~* ~~= 7~~  ~~-2~~*~~x~~* ~~+ 8~~*~~y~~* ~~= 10~~  • Plant A and Plant B are on different watering schedules. This affects their rate of growth. Compare the growth of the two plants to determine when their heights will be the same.  Let *W* = number of weeks  Let *H* = height of the plant after *W* weeks    (Continued on next page)  Given each set of coordinates, graph their corresponding lines.  Solution:    Write an equation that represent the growth rate of Plant A and Plant B.  Solution:  Plant A *H* = 2*W* + 4  Plant B *H* = 4*W* + 2  • At which week will the plants have the same height?  Solution:  The plants have the same height after one week.  Plant A: *H* = 2*W* + 4 Plant B: *H* = 4*W* + 2  Plant A: *H* = 2(1) + 4 Plant B: *H* = 4(1) + 2  Plant A: *H* = 6 Plant B: *H* = 6  After one week, the height of Plant A and Plant B are both 6 inches. | * Unit 5 common summative assessment * Learning activity:   Illustrative mathematics no, one, or infinite solutions  [resources\Illustrative mathematics assured experience on no one or multiple solutions.docx](resources/Illustrative%20mathematics%20assured%20experience%20on%20no%20one%20or%20multiple%20solutions.docx)  Weblink: <https://www.illustrativemathematics.org/content-standards/8/EE/C/8/tasks/554>  Illustrative mathematics cell phones  [resources\Illustrative mathematics cell phones.docx](resources/Illustrative%20mathematics%20cell%20phones.docx)  Weblink:  <https://www.illustrativemathematics.org/content-standards/8/EE/C/8/tasks/469>  Illustrative mathematics Kim and Jordan  [resources\Illustrative mathematics Kim and Jordan.docx](resources/Illustrative%20mathematics%20Kim%20and%20Jordan.docx)  Weblink:  <https://www.illustrativemathematics.org/content-standards/8/EE/C/8/tasks/73>  Illustrative mathematics fixing the furnace  [resources\Illustrative mathematics fixing the furnace.docx](resources/Illustrative%20mathematics%20fixing%20the%20furnace.docx)  Weblink:  <https://www.illustrativemathematics.org/content-standards/8/EE/C/8/tasks/472> |

**Instructional resources** (including manipulatives, literature connections, professional resources)

Standard #1

Standard #2

Standard #3

Standard #4

Standard #5