**Understanding Systems of Equations**

**and their Solutions (Day 2)**

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| **Overview** |
| **Prerequisite Skills:*** Write and graph a linear equation in slope-intercept form
* Write a linear equation to model a real-world problem
* Identify slope and y-intercept from a linear equation and its graph
* Define system of equations and their solutions
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| **Learning Goals:*** SWBAT discuss the three possible solution types a system may have (one, none, infinitely many)
* SWBAT identify the indicators within a system of equations when given in slope-intercept form to determine how many solutions a system has
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| **Common Core Standards:*** Analyze and solve pairs of simultaneous linear equations (CCSS: 8.EE.8; 2.2.b)

**SVVSD Curriculum Alignment:*** Digits 6.2
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| **Materials:*** PhET Graphing Lines SIM
* <https://phet.colorado.edu/sims/html/graphing-lines/latest/graphing-lines_en.html>
* Computers/iPads for each student or pair of students
* Activity Sheet 2 – Graphing Systems of Equations and their Solution

**Estimated Time:***45 minutes* |
| **Activity Sheet** |
| **Warm Up** – *5 minutes*1. What do you think it would look like if a system of equations has no solution?2. What do you think it would look like if a system has more than one solution?*Student will…** Discuss and/or write the answers to the questions posed
* Make a prediction for each
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| **Guided Exploration** – Problems #1-6: 30 minutes |
| *Teacher will….*1. On the board, make three sections for students to share systems
2. Start the lesson by having students share the systems they created on Activity Sheet 1
3. Instruct students to complete #1-3, provide at least 5 minutes of unguided work time (teacher is silent)
4. Circulate the room, be available for questions and ask probing questions:
* Why do you think the graphs will not intersect?
* Will your lines ever cross in an unseen part of the coordinate plane?
* How does the slope effect whether or not the lines will cross?
1. Stop the class and discuss #1-3; have students share their systems on the board
2. Instruct students to complete #4-6
3. Circulate the room, be available for questions and ask probing questions:
* What can be said about 2 lines that completely overlap?
* How does the slope and y-intercept effect whether or not the lines cross?
* What happens if the slopes are negative?
* How can the equation of each line help you determine how many solutions it has?
1. Stop the class and discuss #4-6; have students share their systems on the board.
2. Discuss any similarities/differences between each set of systems now on the board. Guide students to recognize how the slope and/or y-intercepts effect the number of solutions a system has
3. Instruct students to complete #7
 | *Students will…** Complete problems in the order given
* Share their systems on the board
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| **Informal Assessment** – Exit Ticket: *5 minutes*1. Describe a system of linear equations and its solution.2. How can you determine whether a system has one solution, no solution, or infinitely many solutions by looking at the graph?3. How can you determine whether a system has one solution, no solution, or infinitely many solutions by looking at the equation?\*Students will answer these questions |
| **Moving Forward** |
| * Formalize the rules for inspecting equations to determine the number of solutions a system has; have students add these to their notebooks
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