**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 | |
| **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 | |
| **Common Core Standards:**   * Analyze and solve pairs of simultaneous linear equations (CCSS: 8.EE.8; 2.2.b)   **SVVSD Curriculum Alignment:**   * Digits 6.2 | |
| **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 | |
| **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 |
| **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 | |