**Understanding Systems of Equations**

**and their Solutions (Day 1)**

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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
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| **Learning Goals:*** SWBAT understand and explain that a system of linear equations is two (or more) linear functions interacting a coordinate plane
* SWBAT understand and state that the solution of a system is their point of intersection
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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:*** Supplement but not replace Digits 6.1 and 6.3
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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 1 – Graphing Systems of Equations and their Solution

**Estimated Time:***45 minutes* |
| **Activity Sheet** |
| **Warm Up** – *5 minutes*1. What is a system?2. What might a system of equations look like? |
| *Teacher will…** Pose question #1, if necessary, prompt students to consider various body systems, ecosystems, solar systems, interstate systems, etc
* Once a working definition of systems has been established, ask question #2
* Establish a formal definition for systems of equations in a class discussion
 | *Student will…** Discuss and/or write the answers to the questions posed
* Be able to define a system of equations
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| **Simulation Introduction** - Problem #1: *5-10 minutes* of open play with partner discussionExplore the Graphing Lines (Slope-Intercept) SIM for 5 minutes. Write down 1 – 3 things you discover or remember about working with this SIM. |
| **Guided Exploration** – Problems #2-4: 15-20 minutes |
| *Teacher will….** Instruct students to complete #2-4, provide at least 5 minutes of unguided work time (teacher is silent)
* Circulate the room, be available for questions and ask probing questions:
1. Why do these graphs intersect?
2. What makes them intersect?
3. Does the slope affect whether or not they will intersect?
4. How do the points on each line correlate to each equation?
 | *Student will…** Complete #2-4 on the activity sheet
* Respond to teacher questions
* Discuss findings with a partner
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| **Class Discussion** – *5 minutes*Pause here to have students share work from #2-4 with other pairs or as a class. **Ask the class:**1. What did you notice?2. Discuss common points.3. How do the points on each line correlate to each equation?\*Be sure students have an understanding that each point on a line satisfies the x and y coordinates within each equation |
| **Real World Connection** – Problem #5: *5 minutes*Instruct students to complete and discuss #5.  |
| **Informal Assessment** – Exit Ticket: *5 minutes*1. Define system of equation2. What does the common point in a system represent for a system of equations?\*Students will answer these questions |
| **Going Forward** |
| * Teacher should formalize a definition of solution as it pertains to systems and linear equations and relate it to “common point” as used in this Activity
* Complete Activity Sheet 2 with students.
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