Concept Development Lesson Plan

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*Date Created*: 3/18/2014

*Subject(s)*: Math I

*Topic or Unit of Study:* Solving Systems of Equations- Solving by Graphing

*Grade Level:* 9th Grade

*Materials:* String, SMART Board, markers, and [*Solving Systems of Equations by Graphing- Guided Notes*](Graphing%20Guided%20Notes.docx).

*Summary:* Students will learn about graphing systems of equations by looking at them as two separate lines that intersect.

1. *Focus and Review (15- 20 min):* Each student should know how to graph a linear equation.
   1. “Solution”
      1. The teacher will ask the students to consider the word solution. The students may come up and write similar words one-by-one on the SMART Board after raising their hand. The students may say words not associated with math, which is good. For instance, if a student says “solution of chemicals” the teacher can relate that in a chemical equation, many times you have more than one element or compound and unknown quantities to find. The teacher would guide the students to say words like “equation”, “problem”, “variable”, “answer”, “real-world solution”, etc. Then the students will start categorizing the words into groups like “MATH”, “REAL-WORLD PROBLEMS”, “DEFINITIONS”, “CHEMICALS”, etc. by arranging the words and phrases on the SMART board. After the categories have been made and assigned a name, the students will be asked to state the defining characteristics of each group. If necessary, a reordering of the groups will commence. After everything is set in stone, the teacher will ask “How can these groups be related to each other?” The goal is to guide the students to understand that many problems can use math to find a solution, especially ones with multiple variables.
2. *Statement of Instructional Objective(s) and Assessments:*

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| *Objectives (2 min)* | *Assessments* |
| When given two equations in y-intercept form, the student will be able to graph them and identify the point of intersection. The student will be able to accurately find the solution to the system in 4 out of 5 examples. | Each student will have to complete the following questions on a sheet of paper to turn in.   1. If a system of equations has no solution, what does it look like? *Two parallel lines* 2. Is (-1,-3) a solution to the system   5x-2y=1  x - y=2?  \**Use a complete sentence to explain how you know.*\*  *Yes because when you plug in the ordered pair, the answers are both true.* |

1. *Teacher Input (40 min):*
   1. Watch Your Step… You May Collide
      1. At the beginning of the activity, the teacher will ask for two volunteers and give them each a ball of yarn and asked to stand in the back two corners of the room, while everyone else pushes their desks toward the walls. The volunteers’ jobs are to walk across the room and touch the wall opposite to their side (i.e. if the student is in the back left of the classroom, they will cross and touch the right wall). As they walk, they must leave a trail of yarn on the ground.
      2. After both students have reached their walls, the yarn paths are pulled out to form a straight line. The teacher will ask what happened at the center (the point of intersection). He/she will also ask what the two paths look like/represent (linear equations). The teacher will guide the students to understand that the p.o.i. is the solution to the system of equations.
      3. Finally, the teacher will give an example of what a system of equations looks like.
   2. Guided Notes
      1. The teacher will give them guided notes for solving systems of equations by graphing. This worksheet is attached to the lesson plan.
2. *Guided Practice (20 min):*
   1. On the Guided Notes are a few practice problems. The students will work individually to finish the problems as the teacher walks around for assistance.
3. *Closure (5 min):*
   1. The students will be asked to complete an exit slip, answering the following questions:
      1. If a system of equations has no solution, what does it look like? *Two parallel lines*
      2. Is (-1,-3) a solution to the system

5x-2y=1  
 x - y=2?

\**Use a complete sentence to explain how you know.*\*

*Yes because when you plug in the ordered pair, the answers are both true.*

1. *Independent Practice (5 min):*
   1. The teacher will assign problems in the textbook for homework. (*pg. 385 1, 3, 5, 7, 11, 13, 15, and 19)*

*STANDARDS:*

HSA-REI.C.6 (Solve a system of equations using graphs and substitution)

HSA-REI.D.11 (Relate the solution to a system of equations to the point at which lines intersect)

HSA-CED.A.3 (Modeling with equations and inequalities)

*Plans for Individual Differences:*

Ask Sandra to be the scribe during the concept development portion of the lesson. She can either draw pictures or write out words to best represent what each student comes up with. She should also be asked to do the second activity “Watch Your Step”. When going over the two word problems during the Guided Notes, make sure to point out what came from where. Make sure she gets a colored copy of that page so that she can see the boxes around the words and parts of the equation. On the second problem, ask her to help with finding out what parts are important in the paragraph.

*References (APA style):*

Blakely, M. (n.d.). Watch Your Step... You May Collide. Fredonia- Project PRIME. Retrieved April 23, 2014, from http://www.fredonia.edu/org/projectprime/