**LESSON PLAN OUTLINE- Secondary Mathematics Version**

1. TITLE OF LESSON: Using Slippery Slope to Write an Equation of a Line
2. CONTEXT OF LESSON: Students should feel very comfortable with the CBR at this point and seeing a graph as a representation of a real life event. They have derived the formula for slope in the previous lesson. This lesson will review slope, discover what the y-intercept means, and put the two together to create an equation of a line in slope intercept form.

LEARNING OBJECTIVES and ASSESSMENT:

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| Learning Objective | Bloom | Assessment (Formative/Summative) |
| Students will label and define the y-intercept of a graph | Remember | Completion of Lab sheet |
| Students will write an equation of a line given the graph of the line | Apply, | Completion of Lab sheet |
| Students will create a chant or rap/song to summarize slope intercept form | Understand | Student created song |
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1. RELATED 2009 VIRGINIA STANDARDS OF LEARNING: A.6 The student will graph linear equations and linear inequalities in two variable, including
2. determining the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be describes as rate of change and will be positive, negative, zero, or undefined; and
3. writing the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line.
4. MATERIALS NEEDED: CBR (Calculator Based Ranger), calculator, batteries, lab sheet, overhead or Smart Board
5. PROCEDURE:

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| Time | Mathematical Tasks to be Used,  Teacher Thoughts/Actions/Questions | Anticipated Student Comments, Questions, Actions, and Strategies |
| 5-10 min | BEFORE: Set up CBR. Pass out lab sheets.  Warm up:  Part 1. Individually, they will create a picture, write a definition and write the formula for both slope and velocity.  If students struggle with the picture, ask them to think about what our graphs have looked like before. Definition should be in their own words. Formula should use mathematical symbols.  Read the focus questions together, but not necessarily answering them as a class. “These questions should be your focus as we complete this lab. The y-intercept is the new piece that we will be learning about today. We want to eventually be able to use slope and y intercept to state the location of a line on the coordinate plane.” | Student will share their responses with their neighbor. |
| 20-30 min | DURING:   * Part 2: Class Lab/student participation   We care about the starting distance in this lab because it gives us an exact location on the graph. Show class that if we are just given a slope, there are infinitely many places it could be on the coordinate place. Take a yard stick and move it up and down to show how many lines could be created.  Invite four students to come up, one at a time, to walk according to the type of motion on the chart.  Find the starting point and record in chart.  Label two points line to find the slope. Review how to calculate the slope.  “In order to ‘pin down’ this slope, it needs a set location on the y-axis for its **b**eginning point. This beginning point is known as **b**, or the y intercept. The equation of a slanted line will always be in the form y = mx + b. “m” represents the slope of the line and “b” represents the y-intercept.”  Have walker #2 come up and walk according to the type of motion on the chart.  Discuss differences and similarities of the two first walks. (Steepness of the line, starting point, etc)  Continue with other two walkers and their graphs. Finding more similarities and differences. | Students may ask about equations to other lines other than just slanted ones. That will be discussed at a later date. High level students could do some research to find out what other lines there are and what their equations look like.  Differences and Similarities |
| 10 min  15-20 min  Few minutes | AFTER:   * Part 3: “After” component of lab. Complete as pairs followed by a brief entire class discussion   1) Velocity is speed plus direction, so the distance from the CBR was getting smaller with the walks that were moving towards the CBR, thus resulting in a negative slope, and a negative velocity.  2) y intercept is starting point  3) measured in meters/sec, or the change in distance over the change in time. Two units coming together to make a rate  4) “steeper”  5) moving away = increasing/positive slope  Moving toward = decreasing/negative slope  6) change in distance divided by the change in time or meters/sec   * Practice: Pairs Check with a Switch   Pairs will be given two sheets with 4-6 graphs each. They each will do #1, switch and check the other’s person work. *Without* switching papers back, they will complete #2 on the other person’s original sheet. They will switch again and check the other person’s work. Process continues until all problems have been completed. If neither person understands how to solve a problem, the teacher will assist them.  Summarize elements of slope intercept form.  Have students repeat as a chant or with a beat, “ m is slope, b is y-intercept” several times. Make it fun.  Extension: Students could make a rap of a song about how to remember slope intercept form. | Pairs Check with a Switch |

1. MEETING THE NEEDS OF ALL STUDENTS: Multiple representations has been used, words, picture, graph, formula, etc. Multiple intelligences and TAPS have been incorporated to give all students opportunities to learn and participate at different levels.
2. WHAT COULD GO WRONG WITH THIS LESSON AND WHAT WILL YOU DO ABOUT IT? Some students may be bored with this because it is another activity with the CBR, but I think there are enough new elements to provide interest.
3. CONNECTION TO CTA: Dan Mulligan taught about the eight multiple intelligences and I think looking for ways to incorporate more variety in my lessons will only help increase the depth of understanding for each student. I also really loved the idea John Strebe suggested of Pairs Check with a Switch. I know he had said to use it as a review, so I’m not sure if using it simply as a practice will be as effective. I thought it could work though!

