**Lesson Title: Ski Slope**                              **Date:_____**

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| **Subject:** Pre-Algebra, Algebra I, or Algebra II | **Topic:** Slope of a Line |
| **Grade:** 7, 8, or 10 | **Designer:** Jessica Ulcickas |

## Stage 1 – Desired Results

**Lesson Overview**: This activity explores slopes of lines and how a numerical slope is represented on the x-y axes.  The activity is intended for pre-algebra or Algebra I students who are learning about the slope of a line for the first time.  By the end of the activity, students should be able to graph a line with a given slope, using rise over run, and identify the slope of a line given a graph of the line.

**Standards Addressed**:

CCSS.Math.Content.HSA-CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CCSS.Math.Content.8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line*.

| **Enduring Understanding**: | **Essential Questions**: |
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| The steepness of a line can be represented numerically through the concept of slope.  The larger the numerical value of the slope is, the steeper the line.  Negative slopes work in a similar fashion to positive slopes; however lines with negative slope slant downward to the right, not upward.  The numerical value of a slope represents a rise over a run, and that value can be used to graph a line. | How does the numerical slope of a line affect the graph of the line? How can we use the numerical concept of slope in order to help understand real life situations? |
| **Students will need to know**: Students must know how to graph ordered pairs and work on the x-y axes in all four quadrants. | **Students will be able to**: <ul><li>Graph a line, given a starting location and a particular slope.</li><li>Identify the numerical slope of a given line.</li><li>Estimate a numerical value for a slope based on how steep a given line is.</li><li>Visually represent the difference between a positive and a negative slope.</li></ul> |

# Stage 2 – Assessment Evidence

| Performance Tasks: | Other Evidence: |
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| In this activity:<br>• Asking students to discuss what makes two lines different from one another. Asking students to use the rise and run of a slope to graph a given line. | • To be decided by the teacher. |

# Stage 3 – Learning Plan

| Lesson Procedure: | Required Materials: |
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| Many Days Before:<br>Students will be introduced to the concept of a linear relationship between two variables.<br>Day Of:<br>Students will go to the computer lab in order to complete this activity. The activity will not take all class period, so the remainder of the class period will be at the discretion of the classroom teacher. | • Computers for each student.<br>• Student assessments (if desired). |
| **Possible Discussion Questions for Students**:<br>• In this activity you looked at a problem about babysitting which represented a linear relationship of two variables that directly affect one another. Can you think of any other real life linear relationships we could have discussed?<br><br>• For most of the slopes you looked at in this activity you used all four quadrants, however in the babysitting problem only one quadrant was used. Why do you think that is?<br><br>• What numerical value would create the least steep slope you could possibly imagine?<br><br>• What numerical value would create the steepest slope you could possibly imagine? | **Sample Answers to Discussion Questions**:<br>• The time it takes to get somewhere and the distance traveled are two variables that have a direct effect on one another. The speed would be the slope in this scenario.<br><br>• It doesn't make sense to work for negative hours or to make a negative amount of money. That is why the graph omits negative values for the babysitting problem.<br><br>• A numerical value of zero would create a horizontal slope.<br><br>• Students may look at infinity as the largest slope possible and this can lead to a discussion about vertical slopes and how they are undefined. |