

Lesson Title: $y = mx + b$

Date: _____

Subject: Pre-Algebra, Algebra I, or Algebra II **Topic:** Graphing Lines in Slope-Intercept Form
Grade: 7, 8, or 10 **Designer:** Jessica Ulcickas

Stage 1 – Desired Results

Lesson Overview: This activity teaches students how to graph lines using a slope and a y-intercept. The activity is intended for pre-algebra or Algebra I students who are learning to graph lines for the first time, or Algebra II students who are reviewing how to graph lines or who need extra help with the subject. After completing the activity, students will be able to graph a line using a slope and y-intercept, identify the slope and y-intercept from the equation of a line in slope-intercept form, and provide the equation of a line in slope-intercept form from the graph of a 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.HSA-REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

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.*

CCSS.Math.Content.8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Enduring Understanding:

There are many different ways to graph a linear relationship. One way is to use the slope and the y-intercept. To graph a line in this manner, the first step is to find and graph the y-intercept. After that, beginning at the y-intercept use the slope of the given line to count up the rise of the line and over the run in

Essential Questions:

How does the equation of a line affect its graphical representation?
How can we use a graphical representation of a linear relationship in order to help understand real life situations?

<p>order to find a second point on the line. When you connect these two points, you have successfully graphed the line, can then be used to understand more about the linear relationship the line represents.</p>	
<p>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 are also expected to have exposure to the slope-intercept form of a linear equation ($y = mx + b$).</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Graph a line given an initial point and a particular slope. • Identify the numerical slope of a given linear equation of the form $y = mx + b$. • Identify the y-intercept of a given linear equation of the form $y = mx + b$. • Graph a linear equation given in the form $y = mx + b$. • Analyze a real life situation using a linear equation and graph.
<p>Stage 2 – Assessment Evidence</p>	
<p>Performance Tasks: In this activity:</p> <ul style="list-style-type: none"> • Asking students to identify the slope and y-intercept, given an equation in slope-intercept form. • Asking students to graph a line given the equation of a line in slope intercept form. <p>Asking students to analyze the meaning of a real life linear relationship by answering a series of questions about the graph of a given linear relationship.</p>	<p>Other Evidence:</p> <ul style="list-style-type: none"> • To be decided by the teacher.
<p>Stage 3 – Learning Plan</p>	
<p>Lesson Procedure: <u>Many Days Before:</u> Students will be introduced to the concept of a linear relationship between two variables. Students will learn about the concept of slope and how it relates to the linear relationship</p>	<p>Required Materials:</p> <ul style="list-style-type: none"> • Computers for each student.

<p>between two variables. Students will also learn about slope-intercept form of a linear equation ($y = mx + b$).</p> <p><u>Day Of:</u></p> <p>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.</p>	
<p>Possible Discussion Questions for Students:</p> <ul style="list-style-type: none"> • 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? • For most of the lines 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? • Say you are given the equation of a line. How will changing the y-intercept of the linear equation affect the graphical image of the given line? • Say you are given the equation of a line. How will changing the slope of the linear equation affect the graphical image of the given line? 	<p>Sample Answers to Discussion Questions:</p> <ul style="list-style-type: none"> • 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. • 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. • Changing the y-intercept will move the line up or down on the y-axis, however the steepness will stay the same. • Changing the slope will change the steepness of the line, however it will not change where the line crosses the y-axis.