Lesson Plan
Lab Edition

Slope-Intercept Form of a Line

Objectives

Students will:
- discover how slope effects the graph of a line.
- relate **b** to the y-intercept of a line.
- determine the equation of a line given **m** and **b.**

Prerequisite Knowledge

Students are able to:
- plot points on the coordinate plane.
- determine the slope between two points.

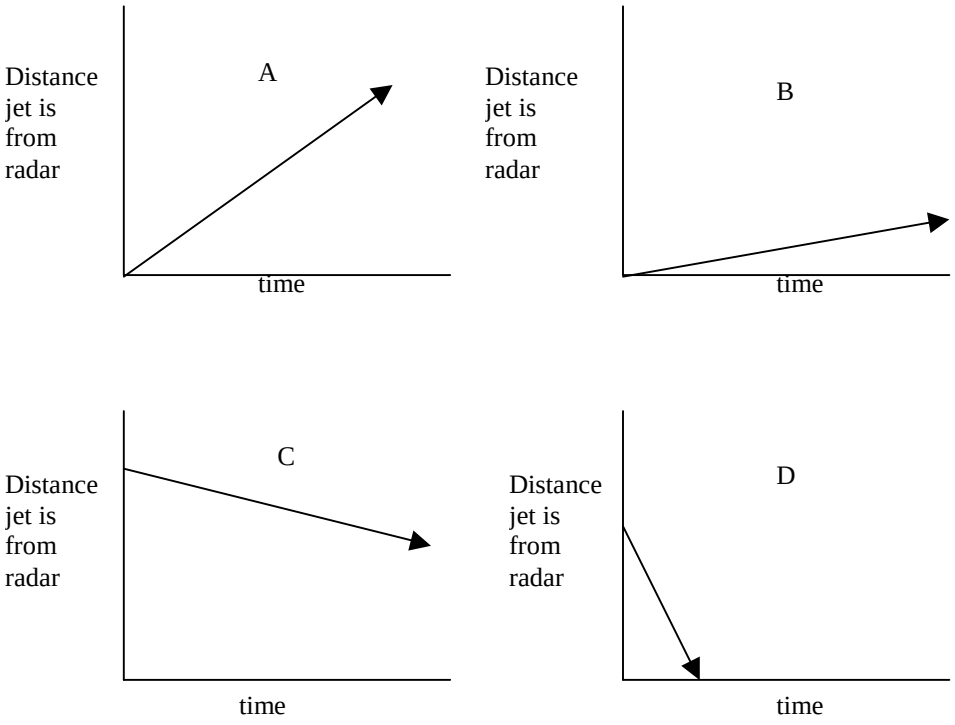
Resources
- This lesson assumes that your classroom has enough computers for all your students, either working individually or in small groups. If your classroom has only one computer, from which you can lecture, see the lecture version of this lesson.
- Rulers, pencil, paper
- Access to http://www.explorelearning.com/
- Copies of the worksheet for each student (optional)

Lesson Preparation

Before conducting this lesson, be sure to read through it thoroughly, and familiarize yourself with the Slope-intercept form of a line activity at ExploreLearning.com. You may want to bookmark the activity page for your students. If you like, make copies of the worksheet for each student.

Lesson

Motivation:
Prepare the following graphs for the students before beginning the lesson. These graphs can be on a blackboard, on an overhead projector, or on a worksheet.



Summarize in your own words the following scenario.

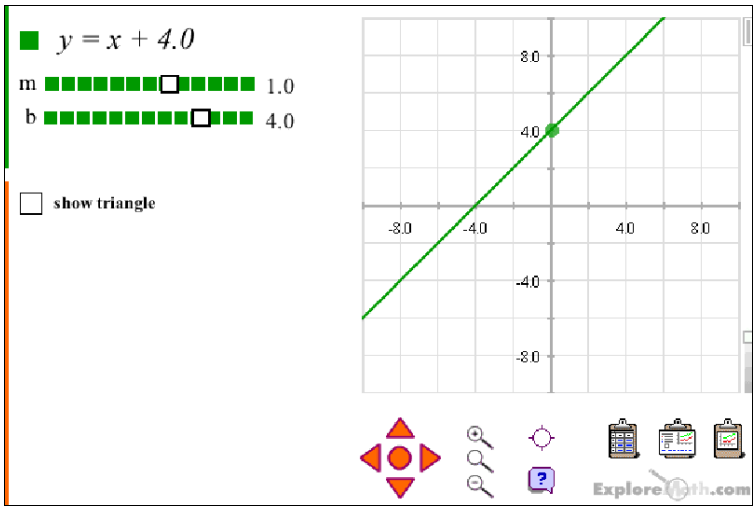
Radar sends out a wave that bounces off an object then returns to the radar. The radar is able to determine the distance an object is away from it at a given time. The radar takes several readings at slightly different times to calculate the speed of an object. If these readings were graphed on a time-distance graph, they may look like these (display the four graphs).

Now break students up into small groups of three or four. Ask the students which graphs show jets that are moving away from the radar. Have students explain why jet D is not the correct answer. Ask students which jet is going the fastest. Have students explain answers. Ask students which jet was the farthest away from the radar when the timing started. Try to lead students towards answers that involve the concept of slope and y-intercept. Have students draw a graph of a helicopter that is hovering **100** yards away from the radar. Discuss the various answers.

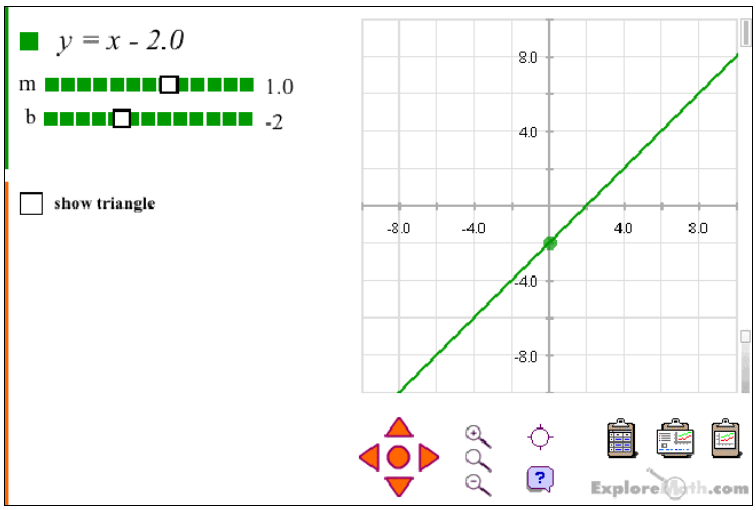
The slope-intercept activity

To show this activity in action, go to the Slope-intercept form of a line activity at ExploreLearning.com. If you are using a worksheet, you can give it to your students now if you want them to follow along, or you can hand it out at the end of class for them to review later.

Finding the meaning of 'b'
On the y-axis of the graph is a green point. Have students drag the green point up the y-axis to the coordinates **(0, 4)**.



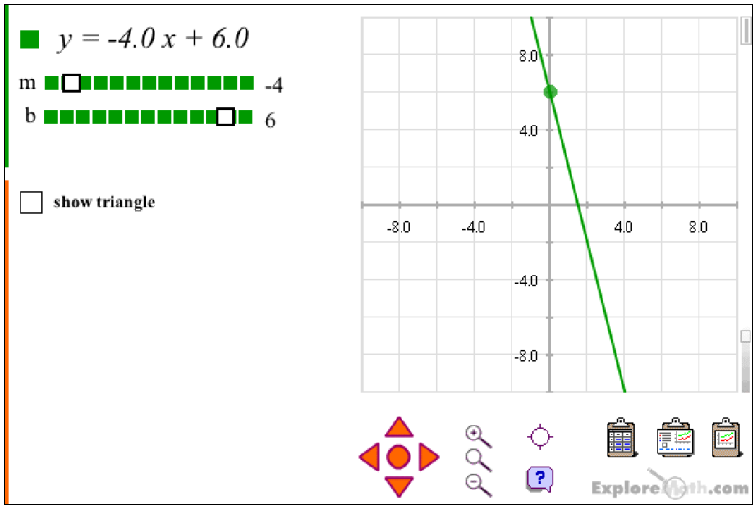
Ask students what the value of b is next to the b slide bar. Now have students move the green point to **(0, -2)**.



Ask the students to explain what happened to the value of **b**.

Now have students change the value of the slope to by dragging the indicator on the slope slide bar to the right, then to the left. Ask students what happened to the value of **b** when the slope value was changed.

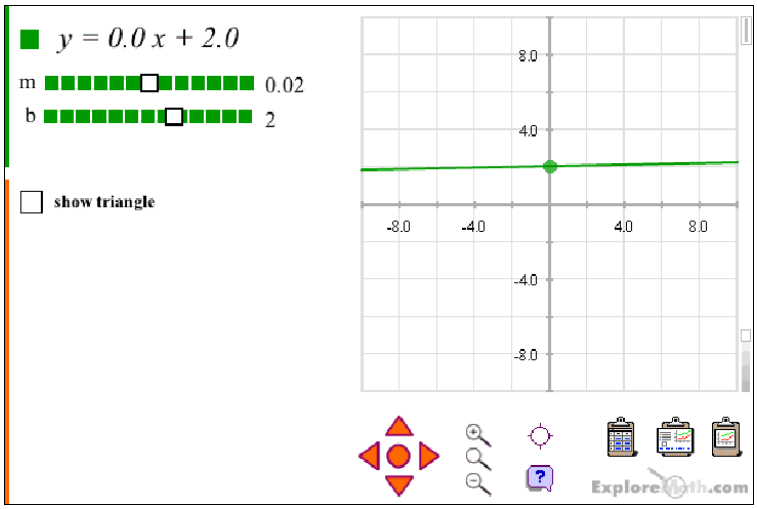
Ask students to predict the value of b for the line **y= -4x + 6**. Instruct students to type in the equation for this line and check their answer.



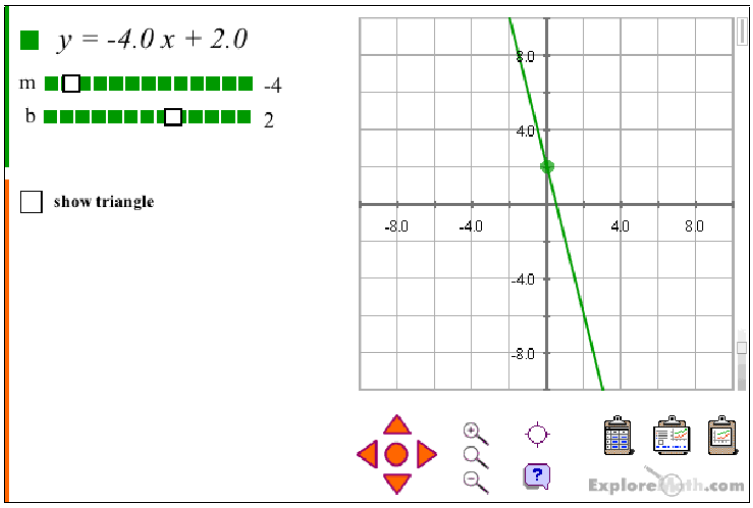
Have students make conjectures about the meaning of **b**. Students should be able to see that **b** represents the y-intercept of a line.

The meaning of m

Instruct students to go to the right of the slope bar and type in (one at a time) the following values for **m**: **1/3**, **½**, **1**, **2**, **4**, **6**. Ask students to describe the changes in the line as the value of m gets larger. Now have students to type in the numbers in reverse order. Ask students to describe the changes in the line as **m** gets closer to zero.



Now instruct students to type in some negative values for **m**.



Ask students how lines with positive slope differ from lines with negative slope.

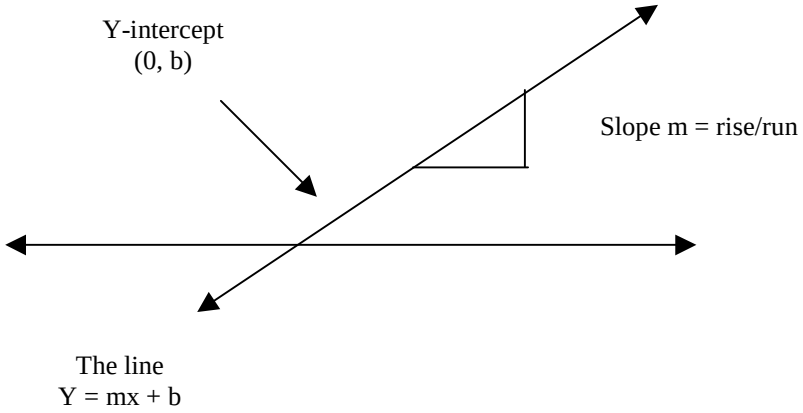
Ask students to make conjectures about **m**. Students should see that **m** represents slope and should be able to describe how different values of **m** change the graph of a line.

Putting it all together
Give students the equations of several lines. Have them graph the lines on their own paper. Once students complete this task, they should type in the equation for each line and check their answer.

Now give students the graphs of several lines and have the students find the proper equations. (The clipboard feature allows you to copy and paste graphs into word processing documents.) Have students explain their answers for each graph.

Conclusion

Lines can be defined given **m** and **b**. The value of **b** determines where a line crosses the y-axis. The value of **m** determines the slope of the line. Both can be put together to make an equation for the line: **y** = **mx** + **b**. This form of a linear equation is called the slope-intercept form.



In subsequent activities, you will learn other methods of determining the equation for a line.