**Get It Straight**

You know that any equation involving x and y can be used to create a graph. The graph is defined as the set of all those points whose coordinates fit the equation.

Some equations have graphs that are straight lines. These are called linear equations. When a linear equation expresses *y* in terms of *x*, it can be referred to as a linear function. All linear functions can be simplified so that they fit the form *y = ax + b*, where *a* and *b* represent two numbers.

The number *a* is referred to as the coefficient of x and the number *b* is called the constant term. Keep in mind that these numbers can be positive, negative, or zero, and they can also be identical.

In this activity, you will investigate linear functions and straight-line graphs. Here are some questions to explore.

* How do you change the equation in order to change the “slant” of its graph?
* How do you change the equation in order to shift the whole graph up or down?
* When do two linear functions give parallel lines (lines that never meet)? Why?
* What linear functions give horizontal lines? Why?
* When do two linear functions give lines that are mirror images of each other with the *y*-axis as the mirror? Why?
* When do two linear functions give perpendicular lines (lines that form a right angle)? Why?

Do not feel limited by these questions—let your imagination soar! Keep track of any other interesting questions you think of, even if you can’t answer them.

*Write-up*

You should do a written report of what you learn, using these categories.

1. Questions: What questions did you ask yourself? Why did you ask them? Which ones did you decide to explore?
2. Results and Conjectures: What conjectures did you find as possible answers to your questions? What rules or patterns did you find in exploring your questions? If you can prove that your conjectures are right, do so. If you can explain why some rule or pattern works, do that as well. If possible, generalize your results.