Functions

In eighth grade, the concept of a **function** is introduced. Students learn that a function is a correspondence that associates each given input with exactly one output. A function is essentially a formalized construct for expressing a mathematical rule.

Functions are the focus for much of algebra and higher mathematics. Students at this level will give special attention to linear functions and will learn to recognize when a function is not linear. They learn that a linear function defines a straight line and can be expressed by the equation $y = mx + b$ where m is the slope of the line and b is the y-intercept.

> ### The Grade 8 Common Core State Standards for Functions specify that students should—
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> • Define, evaluate, and compare functions.
> • Use functions to model relationships between quantities.

Thorough understanding of functions is essential for future math success. Teachers will want to offer many opportunities for understanding. The following hands-on activities will help students learn important function concepts in a meaningful way.

Mathematically proficient students look for generalized methods and shortcuts in problem-solving. For example, by paying attention to the calculation of slope as they repeatedly check whether points are on a line, students might generate the related equation. Coaching students to look for such patterns will be important.

Additionally, by drawing an analogy between functions and machines, students can further appreciate the repeated reasoning inherent in functions. Visualizing a function machine as a box open at two ends, students can appreciate the process of putting something in one end, having something happen to it in the middle, and getting something else out from the other end. The function is the machine inside the box, and it is defined by what it does to the input that you give to it. The process never changes. It works the same way every time! Students can look for and expect such logical repetition in functions.