

Expressions and Equations

Algebra can be thought of as a “language” for generalizing arithmetic. When we take real-world situations and translate them into mathematical phrases or statements, we are *expressing* them in this language.

An algebraic **expression** is a combination of numbers, variables, and operations done with them. For example, $x + y + z$ and $2x - 9$ are algebraic expressions. An algebraic **equation** is a statement that declares equality between expressions, $x + y + z = 2x - 9$, for example.

Related to equations is a different kind of statement called an *inequality*. While an equation is a statement of comparison that says two expressions are equal, an inequality might say that one expression is less than another.

The Grade 6 Common Core State Standards for Expressions and Equations specify that students should—

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

At this level, students start learning how to work with expressions and equations to do a variety of useful things. Many students will feel a newfound sense of power in using expressions and equations to solve problems. Others will struggle with the new “language.” The following hands-on activities will help students visualize these new concepts. The activities can help them develop deeper understanding and build on the algebraic thinking and reasoning skills learned in previous grades.

While working through the activities, teachers will want to encourage students to look closely for patterns in the structure of algebraic expressions and equations. Discerning relationships and patterns helps students expect outcomes and predict solutions, which they monitor and adjust accordingly. This process is important for becoming mathematically proficient.