



Curriculum Units by Fellows of the National Initiative
2011 Volume VI: Great Ideas of Primary Mathematics

What an Expression Expresses

Guide for Curriculum Unit 11.06.09, published September 2011

by Sarah Kingon

This is a unit that focuses on the ideas of variables, expressions, and equations. It develops the idea of an algebraic expression as a recipe for a computation. It will explore how variables are used to create simple expressions, and how more complicated expressions can be formed from simpler ones, using the grammar of expressions and the rules of arithmetic. Too often I find my students solving an expression because they assume they are supposed to find an answer. This unit is meant to clarify the concepts of variables, the equals sign and expressions as recipes for computation—by looking at their components, different contexts in which they occur, how we manipulate expressions and the justification behind the manipulations, and the logic behind solving equations. The nine rules of arithmetic will be emphasized as proven ways in which we can justify mathematical manipulations as well as balance properties for solving equations (equal added to equal makes equal and equal multiplied by equal makes equal). Likewise, in dealing with equations, the main classical principles for transforming equations will be made explicit. The unit continues from expressions to equations and emphasizes the connections as well as differences between the two, presenting expressions as recipes for computation and equations as questions, asking for which value(s) of the relevant variable(s) the expressions on the two sides of the equation are equal. The idea of equivalence, first of expressions, and then of equations, is prominent throughout the unit. My students will be expected to use the properties to justify all of their reasoning when simplifying and solving. This will encourage them to think about the math they are doing. The goal is that they should come to see that solving an equation is a process of logical reasoning.

(Developed for Algebra I/Math, High School grades 9-12; recommended for Algebra I/Math, High School grades 9-12, and Pre-Algebra, Middle School grades)

<https://teachers.yale.edu>

©2023 by the Yale-New Haven Teachers Institute, Yale University, All Rights Reserved. Yale National Initiative®, Yale-New Haven Teachers Institute®, On Common Ground®, and League of Teachers Institutes® are registered trademarks of Yale University.

For terms of use visit https://teachers.yale.edu/terms_of_use