



Curriculum Units by Fellows of the National Initiative

2023 Volume III: Transitions in the Conception of Number: From Whole Numbers to Rational Numbers to Algebra

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## **From English to Algebra: Solving Linear Equations with Word Problems**

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As the great mathematician George Pólya once said, “It is better to solve one problem five different ways, than to solve five problems one way.” I’ve found this to be especially true with word problems. A given linear word problem can be solved in a multitude of ways; one can solve it algebraically (with “variables”), arithmetically (with constants), or illustratively (with pictures or use of manipulatives). When students engage in all three methods of solving linear equations, they build on prior knowledge and foster a more comprehensive understanding of variables and manipulation of algebraic equations.

This curriculum unit focuses on students’ conceptual understanding of the role of variables and their units in linear equations. It relies heavily on the Japanese teaching strategy of Kikan-jyunshi or Kikan-shido, in which the teacher identifies individual student work to discuss with the whole class. The unit follows the BSCS 5E Instructional Model phases: engage (solve one word problem three different ways), explore (translate other word problems into equations), explain (justify the use of operations in translated equations), elaborate (create word problems that exemplify given equations), and evaluate (assess formatively).

Key Words: word problems, linear equations, variables, algebra, algebraic equations, units, Kikan-juynshi, Kikan-shido, BSCS 5E Instructional Model

(Developed for Integrated Mathematics I, grades 9-12; recommended for Pre-Algebra, grade 7; Algebra I, grade 8; and Integrated Mathematics I, grades 9-12)

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