

# Contents

Foreword .....	v
Preface .....	vii
Introduction .....	1
Why Addition and Subtraction?.....	1
Understanding Addition and Subtraction .....	2
The Big Ideas and Essential Understandings .....	4
Benefits for Teaching, Learning, and Assessing .....	4
Ready to Begin .....	6
Chapter 1 .....	7
<b>Addition and Subtraction: The Big Ideas and Essential Understandings</b>	
Representing and Solving Problems: Big Idea 1.....	11
Building on sequential counting .....	11
The inverse relationship of addition and subtraction .....	14
Representing situations with addition or subtraction .....	16
Part-part-whole relationships and number sentences .....	25
Representing situations in different ways .....	26
Procedures for Adding and Subtracting: Big Idea 2 .....	28
The commutative and associative properties.....	28
Subtraction: Neither commutative nor associative.....	32
Place value and composition.....	34
Properties and algorithms.....	35
Conclusion .....	47
Chapter 2 .....	49
<b>Connections: Looking Back and Ahead in Learning</b>	
Links to Big Idea 1: Extending Models beyond Whole Numbers .....	50
Part-part-whole and part-whole .....	50
Discrete and continuous models .....	52
Measurement.....	53
A foundation for future mathematics.....	54
Links to Big Idea 2: Place Value and Properties across Content.....	54
Place value .....	54
Multiplication and division .....	56
Algebra .....	58
Measurement concepts.....	60
Data representation .....	63
A link to later topics .....	64
Conclusion .....	64

<b>Chapter 3.....</b>	<b>65</b>
<b>Challenges: Learning, Teaching, and Assessing</b>	
Setting the Stage for Addition and Subtraction .....	66
Representations and Models .....	66
The Structure of Word Problems .....	67
Key words: A failed shortcut .....	70
Reasoning about actions and relationships .....	71
The Structure of Equations.....	71
Using Appropriate Language .....	74
Student-Invented Strategies .....	75
Assessing Evidence of Learning .....	77
Is Subtraction Harder than Addition? .....	80
Conclusion .....	80
<b>References.....</b>	<b>82</b>