Contents

Preface vii
Acknowledgments xiii
About the Author xv

A Look at the Academic Research:
Intervention in the Mathematics Classroom 1
   Introduction to the Academic Research 2
   Equity and Quality in the Math Classroom 3
   Student Dispositions 4
   Activating Prior Knowledge 5
   Representations 5
   Estimation and Mental Math 6
   Alternative Algorithms 8
   Differentiating Instruction 9
   Instructional Games 11
   Response to Intervention 12
   Questions for Teacher Reflection 14

Big Ideas in Computation and Problem Solving 15
   The Base-Ten Place-Value System and Multidigit Computation 16
   Actions and Operations: Problem Structures for
   Addition, Subtraction, Multiplication, and Division 17
   Questions for Teacher Reflection 24

Unit 1: Addition of Whole Numbers 25
   Diagnostic Test 26
   Item Analysis for Diagnostic Test 28
   Error Patterns & Intervention Activities 31
   Practice Exercises 47
   Questions for Teacher Reflection 48

Unit 2: Subtraction of Whole Numbers 49
   Diagnostic Test 50
   Item Analysis for Diagnostic Test 52
   Error Patterns & Intervention Activities 55
   Practice Exercises 74
   Questions for Teacher Reflection 75

Unit 3: Multiplication of Whole Numbers 77
   Diagnostic Test 78
   Item Analysis for Diagnostic Test 80
   Error Patterns & Intervention Activities 83
   Practice Exercises 109
   Questions for Teacher Reflection 110
<table>
<thead>
<tr>
<th><strong>Unit 4: Division of Whole Numbers</strong></th>
<th>111</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Test</td>
<td>112</td>
</tr>
<tr>
<td>Item Analysis for Diagnostic Test</td>
<td>114</td>
</tr>
<tr>
<td>Error Patterns &amp; Intervention Activities</td>
<td>117</td>
</tr>
<tr>
<td>Practice Exercises</td>
<td>135</td>
</tr>
<tr>
<td>Questions for Teacher Reflection</td>
<td>136</td>
</tr>
</tbody>
</table>

**Resources for Estimation, Instructional Games, and Follow-Up Activities (Blacklines)** 137

**Resources for Addition** 139
- Follow-Up Activity: Next Number, Please 141
- Roller Coaster Rounding 143
- Using Front-End Estimation to Check for Reasonableness: Addition 145
- Instructional Game: Keeping Score in Bowling 146

**Resources for Subtraction** 151
- Using Front-End Estimation to Check for Reasonableness: Subtraction 153
- Instructional Game: Balance the +/- Number Sentence! 154
- Follow-Up Activity: Editor Error Search (+/-) 158
- Instructional Game: Target Math (+/-) 159

**Resources for Multiplication** 163
- Touching on the Facts With Your Fingers 165
- Using Front-End Estimation to Check for Reasonableness: Multiplication 167
- Follow-Up Activity: Editor Error Search (×) 172

**Resources for Division** 173
- Using Front-End Estimation to Check for Reasonableness: Division 175
- Using Compatible Numbers to Check for Reasonableness (+, −, ×, ÷) 176
- Instructional Game: Balance the ×/÷ Number Sentence! 177
- Follow-Up Activity: Abbott and Costello’s Number Nonsense 179
- Instructional Game: Target Math (×/÷) 181

**Multiuse Resources (Blacklines)** 183
- Play Money 184
- Place-Value Mat for Addition/Subtraction 185
- Place-Value Grids for Addition/Subtraction 186
- Place-Value Grids for Division 187
- Tables for Addition/Subtraction 189
- Tables for Multiplication/Division 191

**Answers for Student Materials** 193
- Answers for Unit 1: Addition of Whole Numbers 193
- Answers for Unit 2: Subtraction of Whole Numbers 195
- Answers for Unit 3: Multiplication of Whole Numbers 197
- Answers for Unit 4: Division of Whole Numbers 198

**References** 201