

Foreword by Deborah Loewenberg Ball xvii
How to Use This Resource xix
The Common Core State Standards
 A Letter from Math Coach Lori MacDonald xxiii
 Summary of Connections with the Common Core State Standards xxv
Video Clips by Chapter xxix
Video Clips by Grade, Including Demographics xxxi

PART I What Is a Fraction? 1

Chapter 1 Making Sense: Fractions as Numbers 3
 Classroom Scenario 4
 What's the Math? 7
 What's the Research? 9
 Classroom Activities 11

- ▶ **Video Clip 1a** Placing $\frac{1}{2}$ on the Number Line 16
- ▶ **Video Clip 1b** Using Cuisenaire Rods to Place $\frac{1}{3}$ on the Number Line 17
- ▶ **Video Clip 1c** Using Cuisenaire Rods to Place $\frac{3}{2}$ on the Number Line 18
- ▶ **Video Clip 1d** Deciding Where to Place $\frac{11}{3}$ on the Number Line 19

Wrapping It Up 24

PART II Addition and Subtraction with Fractions 25

Chapter 2 Developing Awareness: Addition and Subtraction Problem Types 27
 What's the Context? 28
 What's the Research? 30
 Wrapping It Up 35

Chapter 3 Making Sense: Addition with Fractions 37
 Classroom Scenario 38
 What's the Math? 40
 What's the Research? 42
 Classroom Activities 43

- ▶ **Video Clip 3a** Reviewing the "Make a 10" Strategy 51
- ▶ **Video Clip 3b** Introducing "Get to the Whole" 52

- ▶ **Video Clip 3c** $\frac{3}{4} + \frac{3}{4}$: Will’s Strategy 53
- ▶ **Video Clip 3d** $\frac{3}{4} + \frac{3}{4}$: Belen’s Strategy 53
- ▶ **Video Clip 3e** $\frac{3}{5} + \frac{4}{5}$: Malaya’s Strategy 54
- ▶ **Video Clip 3f** $\frac{3}{5} + \frac{4}{5}$: Yuli’s Use of Academic Language 54

Wrapping It Up 60

Chapter 4 Making Sense: Subtraction with Fractions 61

Classroom Scenario 62

What’s the Math? 64

What’s the Research? 65

Classroom Activities 67

Wrapping It Up 76

PART III Multiplication and Division with Fractions 77

Chapter 5 Developing Awareness: Multiplication and Division Problem Types 79

What’s the Context? 80

What’s the Research? 81

Wrapping It Up 85

Chapter 6 Making Sense: Multiplication with Fractions 87

Classroom Scenario 88

What’s the Math? 90

What’s the Research? 95

Classroom Activities 96

- ▶ **Video Clip 6a** Introducing Activity 6.1: Multiplication Patterns 96
- ▶ **Video Clip 6b** Noticing Patterns in Factors and Products 97
- ▶ **Video Clip 6c** Moving from Additive to Multiplicative Language 97
- ▶ **Video Clip 6d** What Number Is $\frac{1}{2}$ of 1? 98
- ▶ **Video Clip 6e** Multiplication as Repeated Addition 99
- ▶ **Video Clip 6f** What Do We Know About $6 \times 2\frac{1}{2}$? 104
- ▶ **Video Clip 6g** “ $6 \times 2\frac{1}{2}$ Has to Be Greater Than $2\frac{1}{2}$ ” 104
- ▶ **Video Clip 6h** Applying the Distributive Property to Reason About the Product of $6 \times 2\frac{1}{2}$ 105
- ▶ **Video Clip 6i** $4\frac{1}{2}$ Is More Than 4 But Less Than 5 105

Wrapping It Up 114

Chapter 7 Making Sense: Division with Fractions 115

Classroom Scenario 116

What's the Math? 119

What's the Research? 124

Classroom Activities 126

▶ **Video Clip 7a** Introducing Activity 7.2: How Long? How Far? 128

▶ **Video Clip 7b** Comparing the Two Jogging Experiences 128

▶ **Video Clip 7c** How Many $\frac{1}{4}$ s Are in 1? 130

▶ **Video Clip 7d** How Many $\frac{1}{4}$ s Are in 2? 131

▶ **Video Clip 7e** How Many $\frac{1}{3}$ s Are in 2? 131

Wrapping It Up 138

PART IV Discourse with Fractions 139

Chapter 8 Developing Awareness: Six Strategies for Fostering Student Talk About Fractions 141

Conference Scenario 142

Strategy 1: Using Strategic Tasks 143

▶ **Video Clip 8a** Multiplication Patterns 143

Strategy 2: Creating Records of Thinking 144

▶ **Video Clip 8b** Muhammad's Strategy for Adding $\frac{5}{9}$ and $\frac{8}{9}$ 144

Strategy 3: Building Visual Models 145

▶ **Video Clip 8c** Using the Cuisenaire Rods to Explain Equivalent Fractions 145

Strategy 4: Reasoning with Benchmarks and the Number Line 146

▶ **Video Clip 8d** What Do You Notice About the Numerators and Denominators of Fractions Equal to $\frac{1}{2}$? 146

Strategy 5: Using Talk Moves 147

▶ **Video Clip 8e** Ms. Lee Revoices Ashley's Justification 147

▶ **Video Clip 8f** Julian Restates Carlos's Answer 148

▶ **Video Clip 8g** Multiple Students Share Their Reasoning About Placing $\frac{1}{2}$ on the Number Line 149

▶ **Video Clip 8h** "Tell Us More About That" 150

▶ **Video Clip 8i** Posing a "Thinking Question" 151

Strategy 6: Asking Students to Turn and Talk 152

▶ **Video Clips 6d, 6f, 7d, and 7e** Teachers' Use of Turn and Talk 152

Wrapping It Up 153

Acknowledgments 155
Reproducibles 157
Appendix: Author's Video Reflections 185
References 199
Index 203