# Contents

## **Program Overview**

What Is <i>Leaps and Bounds</i> ?	ix
A Research Foundation	х
How to Use Leaps and Bounds	xiv
Frequently Asked Questions	xvii
Components	xix

## **Teaching Notes**

## Strand: Number

Number Strand Overview		2
Representing Large Whole Numbers Topic Overview (page 6) Diagnostic Tool	Pathway 1: Using Decimals for Large Whole Numbers Open-ended Pathway 2: Representing Millions and Billions Open-ended Pathway 3: Representing Six-Digit Numbers Open-ended Guided	14 15 16 17 18 19
(page 8) Whole Number Operations Topic Overview (page 20) Diagnostic Tool (page 22)	Pathway 1:       Open-ended         Order of Operations       Guided         Pathway 2:       Open-ended         Dividing Whole Numbers       Guided         Pathway 3:       Open-ended         Multiplying Whole Numbers       Guided	26 27 28 29 30 31
Representing and Comparing Decimals Topic Overview (page 32) Diagnostic Tool (page 34)	Pathway 1: Decimals with Many Places Pathway 2: Comparing Decimals Pathway 3: Representing Decimal Thousandths Pathway 4: Multiplying and Dividing by 10s Open-ended Guided Guided Guided Guided Guided Guided Guided Guided Guided Guided Guided	40 41 42 43 44 45 46 47

iii

Decimal Operations Topic Overview (page 48) Diagnostic Tool (page 50)	Pathway 1: Dividing Whole Numbers by Decimals Pathway 2: Dividing Decimals by Whole Numbers Pathway 3: Multiplying with Decimals Pathway 4: Adding and Subtracting Decimals	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	56 57 58 59 60 61 62 63
Relating Situations to Operations Topic Overview (page 64) Diagnostic Tool	Pathway 1: Recognizing Division Situations Pathway 2: Recognizing Multiplication Situations Pathway 3: Recognizing Subtraction Situations	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	70 71 72 73 74 75
(page 66) <b>Comparing Fractions</b> Topic Overview (page 76) Diagnostic Tool (page 78)	Pathway 1: Fractions and Mixed Numbers Pathway 2: Proper Fractions Pathway 3: Equivalent Fractions	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	82 83 84 85 86 87
Fraction Operations Topic Overview (page 88) Diagnostic Tool (page 90)	Pathway 1: Repeated Addition of Fractions Pathway 2: Adding and Subtracting Mixed Numbers < Pathway 3: Subtracting Fractions Pathway 4: Adding Fractions	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> </ul>	98 99 100 101 102 103 104 105
Rates, Percents, and Ratios Topic Overview (page 106) Diagnostic Tool (page 108)	Pathway 1: Using Rates Pathway 2: Using Percents Pathway 3: Using Ratios	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> </ul>	112 113 114 115 116 117

Multiplicative Relationships Topic Overview (page 118) Diagnostic Tool (page 120)	Pathway 1: Divisibility Rules Pathway 2: Prime Numbers and Perfect Squares Pathway 3: Factors and Multiples Pathway 1:	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	124 125 126 127 128 129 136
Integers	Subtracting Integers         Pathway 2:	→ Open-ended → Guided → Open-ended	130 137 138
Topic Overview	Adding Integers		139
(page 130) Diagnostic Tool	Pathway 3: Representing and Comparing Integers <	Open-ended Guided	140 141
(page 132) Strand: Patterns and Algebra			
Patterns and Algebra Overview			142
	Pathway 1:	→ Open-ended	152
	Linear Relations	Guided	153
Patterns	Pathway 2: Representing Patterns	Open-ended	154
Topic Overview	Pathway 3:	Guided	155
(page 144)	Exploring Simple Patterns	Open-ended	156
Diagnostic Tool (page 146)		Guided	157
	Pathway 1:	Open-ended	166
	Solving Problems Using Equations 🦟	Guided	160
Algebra	Pathway 2:	<ul> <li>Open-ended</li> </ul>	168
Topic Overview	Solving Simple Equations	Guided	169
(page 158)	Pathway 3:	> Open-ended	170
Diagnostic Tool (page 160)	Using Variables	Guided	171
Strand: Geometry Geometry Strand Overview			172
-	Pathway 1:		
	Using Isometric Drawings	→ Open-ended → Guided	182 183
3-D Shapes	Pathway 2:	<ul> <li>Open-ended</li> </ul>	185
Topic Overview	Using Different Views	Guided	185
(page 174)	Pathway 3:	> Open-ended	186
(page 174) Diagnostic Tool (page 176)	Using Nets	Guided	187
Convright © 2012 by Nelson Education Ltd	Leans and Bounds 7/8		otents

<b>2-D Shapes</b> Topic Overview (page 188) Diagnostic Tool (page 190)	Pathway 1: Similar Shapes Pathway 2: Congruent Shapes Pathway 3: Sorting and Classifying Polygons	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> </ul>	196 197 198 199 200 201
Geometric Drawings Topic Overview (page 202) Diagnostic Tool (page 204)	Pathway 1: Bisecting Angles and Line Segments Pathway 2: Drawing Lines and Polygons Pathway 3: Drawing Circles Pathway 4: Drawing Triangles Pathway 5: Drawing Triangles Drawing Tria	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	<ul> <li>212</li> <li>213</li> <li>214</li> <li>215</li> <li>216</li> <li>217</li> <li>218</li> <li>219</li> </ul>
Location Topic Overview (page 220) Diagnostic Tool (page 222)	<ul> <li>Pathway 1: Plotting Points in 4 Quadrants</li> <li>Pathway 2: Plotting Points on a Grid</li> <li>Pathway 1: Using Transformations in Designs</li> </ul>	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	226 227 228 229 240 241
Transformations Topic Overview (page 230) Diagnostic Tool (page 232)	Pathway 2: Performing Dilatations Pathway 3: Combining Transformations Pathway 4: Performing Single Transformations	<ul> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> <li>Guided</li> </ul>	242 243 244 245 246 247

## Strand: Measurement

Measurement Strand Overview		248
Area and Perimeter Topic Overview (page 250) Diagnostic Tool (page 252)Pathway 1: Area of Circles Pathway 2: Circumference of Circles Pathway 3: Area of Composite Shapes Pathway 4: Area of Parallelograms and Triangles Pathway 5: Area and Perimeter of Rectangles	<ul> <li>Open-ended</li> <li>Guided</li> </ul>	260 261 262 263 264 265 266 267 268 269

vi

	Pathway 1:		
	Volume of Prisms: Using a Formula 🦟	• Open-ended	278
	Pathway 2:	Guided	279
Volume and Surface Area	Surface Area of Prisms	> Open-ended	280
Topic Overview		Guided	281
(page 270)	Pathway 3:	Open-ended	282
Diagnostic Tool	Volume of Rectangular Prisms		283
(page 272)			
	Pathway 1:	Open-ended	292
	Sums of Angle Measures in Polygons <<	Guided	293
Angles	Pathway 2:		294
Topic Overview	Drawing Angles —		295
(page 284)	Pathway 3:	> Open-ended	296
Diagnostic Tool	Measuring Angles —		297
(page 286)		Guided	277
(page 200)	Pathway 1:	→ Open-ended	304
	Renaming Units	Guided	305
Metric Units	Pathway 2:		
Topic Overview	Selecting a Unit	→ Open-ended → Guided	306
(page 298)	C C	Guidea	307
Diagnostic Tool			
(page 300)			
Strand: Data and Probability			
otrandi Data and Probability			
			200
Data and Probability Strand Overview			308
	Pathway 1:	→ Open-ended	<b>308</b> 320
	Pathway 1: Using Circle Graphs and Line Graphs <	→ Open-ended → Guided	
Data and Probability Strand Overview	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2:	Guided	320
Data and Probability Strand Overview Displaying Data	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling	-	320 321
Data and Probability Strand Overview Displaying Data Topic Overview	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling Pathway 3:	Guided Open-ended Guided	320 321 322
Data and Probability Strand Overview Displaying Data Topic Overview (page 310)	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling	Guided Open-ended	320 321 322 323 324
Displaying Data Topic Overview (page 310) Diagnostic Tool	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling Pathway 3:	Guided Open-ended Guided Open-ended	320 321 322 323
Data and Probability Strand Overview Displaying Data Topic Overview (page 310)	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling Pathway 3: Interpreting Graphs Pathway 1:	Guided Guided Guided Guided Guided	320 321 322 323 324 325
Displaying Data Topic Overview (page 310) Diagnostic Tool	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling Pathway 3: Interpreting Graphs	Guided Open-ended Guided Open-ended Guided Open-ended	<ul> <li>320</li> <li>321</li> <li>322</li> <li>323</li> <li>324</li> <li>325</li> <li>334</li> </ul>
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312)	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling Pathway 3: Interpreting Graphs Pathway 1:	Guided Open-ended Guided Open-ended Guided Open-ended Guided	320 321 322 323 324 325 334 335
Data and Probability Strand Overview Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data	Pathway 1: Using Circle Graphs and Line Graphs < Pathway 2: Bias and Sampling Pathway 3: Interpreting Graphs Pathway 1: Effects of Changing Data	Guided Guided Guided Guided Guided Open-ended Guided Open-ended Guided	320 321 322 323 324 325 334 335 336
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview	Pathway 1: Using Circle Graphs and Line Graphs           Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326)	Pathway 1: Using Circle Graphs and Line Graphs           Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode	<ul> <li>Guided</li> <li>Open-ended</li> </ul>	320 321 322 323 324 325 334 335 336 337 338
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool	Pathway 1: Using Circle Graphs and Line Graphs           Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326)	Pathway 1: Using Circle Graphs and Line Graphs           Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> <li>Guided</li> <li>Guided</li> <li>Guided</li> <li>Guided</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool	Pathway 1: Using Circle Graphs and Line Graphs           Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool (page 328)	Pathway 1: Using Circle Graphs and Line Graphs           Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean         Pathway 1:	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348 349
Data and Probability Strand Overview Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool (page 328) Probability	Pathway 1:         Using Circle Graphs and Line Graphs         Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean         Pathway 1:         Probability: Independent Events         Pathway 2:	<ul> <li>Guided</li> <li>Open-ended</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348 349 350
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool (page 328) Probability Topic Overview	Pathway 1:         Using Circle Graphs and Line Graphs         Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean         Pathway 1:         Probability: Independent Events         Pathway 2:         Theoretical Probability	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348 349 350 351
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool (page 328) Probability Topic Overview (page 340)	Pathway 1:         Using Circle Graphs and Line Graphs         Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean         Pathway 1:         Probability: Independent Events         Pathway 2:         Theoretical Probability         Pathway 3:	<ul> <li>Guided</li> <li>Open-ended</li> <li>Open-ended</li> <li>Open-ended</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348 349 350 351 352
Data and Probability Strand Overview Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool (page 328) Probability Topic Overview (page 340) Diagnostic Tool Diagnostic Tool	Pathway 1:         Using Circle Graphs and Line Graphs         Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean         Pathway 1:         Probability: Independent Events         Pathway 2:         Theoretical Probability	<ul> <li>Guided</li> <li>Open-ended</li> <li>Guided</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348 349 350 351
Displaying Data Topic Overview (page 310) Diagnostic Tool (page 312) Summarizing Data Topic Overview (page 326) Diagnostic Tool (page 328) Probability Topic Overview (page 340)	Pathway 1:         Using Circle Graphs and Line Graphs         Pathway 2:         Bias and Sampling         Pathway 3:         Interpreting Graphs         Pathway 1:         Effects of Changing Data         Pathway 2:         Using Mean, Median, and Mode         Pathway 3:         Calculating the Mean         Pathway 1:         Probability: Independent Events         Pathway 2:         Theoretical Probability         Pathway 3:	<ul> <li>Guided</li> <li>Open-ended</li> <li>Open-ended</li> <li>Open-ended</li> </ul>	320 321 322 323 324 325 334 335 336 337 338 339 348 349 350 351 352

vii