

BIG IDEAS
MATH[®]
Modeling Real Life

Grade 3

Volume 2

Ron Larson
Laurie Boswell



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Ron Larson, Ph.D., is well known as the lead author of a comprehensive program for mathematics that spans school mathematics and college courses. He holds the distinction of Professor Emeritus from Penn State Erie, The Behrend College, where he taught for nearly 40 years. He received his Ph.D. in mathematics from the University of Colorado. Dr. Larson's numerous professional activities keep him actively involved in the mathematics education community and allow him to fully understand the needs of students, teachers, supervisors, and administrators.

A handwritten signature of Ron Larson in black ink, written in a cursive style.



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Laurie Boswell, Ed.D., is the former Head of School at Riverside School in Lyndonville, Vermont. In addition to textbook authoring, she provides mathematics consulting and embedded coaching sessions. Dr. Boswell received her Ed.D. from the University of Vermont in 2010. She is a recipient of the Presidential Award for Excellence in Mathematics Teaching and is a Tandy Technology Scholar. Laurie has taught math to students at all levels, elementary through college. In addition, Laurie has served on the NCTM Board of Directors and as a Regional Director for NCSM. Along with Ron, Laurie has co-authored numerous math programs and has become a popular national speaker.

A handwritten signature of Laurie Boswell in black ink, written in a cursive style.

Dr. Ron Larson and Dr. Laurie Boswell began writing together in 1992. Since that time, they have authored over four dozen textbooks. This successful collaboration allows for one voice from Kindergarten through Algebra 2.

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Big Ideas Learning would like to express our gratitude to the mathematics education and instruction experts who served as our advisory panel, contributing specialists, and reviewers during the writing of *Big Ideas Math: Modeling Real Life*. Their input was an invaluable asset during the development of this program.

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Research

Ron Larson and Laurie Boswell used the latest in educational research, along with the body of knowledge collected from expert mathematics instructors, to develop the *Modeling Real Life* series. The pedagogical approach used in this program follows the best practices outlined in the most prominent and widely accepted educational research, including:

- *Visible Learning*
John Hattie © 2009
- *Visible Learning for Teachers*
John Hattie © 2012
- *Visible Learning for Mathematics*
John Hattie © 2017
- *Principles to Actions: Ensuring Mathematical Success for All*
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- *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement*
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- *Rigorous PBL by Design: Three Shifts for Developing Confident and Competent Learners*
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- Rigor/Relevance Framework®
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- *Understanding by Design*
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- Achieve, ACT, and The College Board
- *Elementary and Middle School Mathematics: Teaching Developmentally*
John A. Van de Walle and Karen S. Karp © 2015
- *Evaluating the Quality of Learning: The SOLO Taxonomy*
John B. Biggs & Kevin F. Collis © 1982
- *Unlocking Formative Assessment: Practical Strategies for Enhancing Students' Learning in the Primary and Intermediate Classroom*
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- *Formative Assessment in the Secondary Classroom*
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- *Improving Student Achievement: A Practical Guide to Assessment for Learning*
Toni Glasson © 2009

Mathematical Processes and Proficiencies

Big Ideas Math: Modeling Real Life reinforces the Process Standards from NCTM and the Five Strands of Mathematical Proficiency endorsed by the National Research Council. With *Big Ideas Math*, students get the practice they need to become well-rounded, mathematically proficient learners.

Problem Solving/Strategic Competence

- *Think & Grow: Modeling Real Life* examples use problem-solving strategies, such as drawing a picture, circling knowns, and underlining unknowns. They also use a formal problem-solving plan: understand the problem, make a plan, and solve and check.
- Real-life problems are provided to help students learn to apply the mathematics that they are learning to everyday life.
- Real-life problems help students use the structure of mathematics to break down and solve more difficult problems.

Reasoning and Proof/Adaptive Reasoning

- *Explore & Grows* allow students to investigate math and make conjectures.
- Questions ask students to explain and justify their reasoning.

Communication

- Cooperative learning opportunities support precise communication.
- Exercises, such as *You Be The Teacher* and *Which One Doesn't Belong?*, provide students the opportunity to critique the reasoning of others.
- *Apply and Grow: Practice* exercises allow students to demonstrate their understanding of the lesson up to that point.
- *ELL Support* notes provide insights into how to support English learners.

Connections

- Prior knowledge is continually brought back and tied in with current learning.
- Performance Tasks tie the topics of a chapter together into one extended task.
- Real-life problems incorporate other disciplines to help students see that math is used across content areas.

Representations/Productive Disposition

- Real-life problems are translated into pictures, diagrams, tables, equations, and graphs to help students analyze relations and to draw conclusions.
- Visual problem-solving models help students create a coherent representation of the problem.
- Multiple representations are presented to help students move from concrete to representative and into abstract thinking.
- *Learning Targets* and *Success Criteria* at the start of each chapter and lesson help students understand what they are going to learn.
- Real-life problems incorporate other disciplines to help students see that math is used across content areas.

Conceptual Understanding

- *Explore & Grows* allow students to investigate math to understand the reasoning behind the rules.

Procedural Fluency

- Skill exercises are provided to continually practice fundamental skills.
- Prior knowledge is continually brought back and tied in with current learning.

Meeting Proficiency and Major Topics

Meeting Proficiency

As standards shift to prepare students for college and careers, the importance of focus, coherence, and rigor continues to grow.

- FOCUS** *Big Ideas Math: Modeling Real Life* emphasizes a narrower and deeper curriculum, ensuring students spend their time on the major topics of each grade.
- COHERENCE** The program was developed around coherent progressions from Kindergarten through eighth grade, guaranteeing students develop and progress their foundational skills through the grades while maintaining a strong focus on the major topics.
- RIGOR** *Big Ideas Math: Modeling Real Life* uses a balance of procedural fluency, conceptual understanding, and real-life applications. Students develop conceptual understanding in every *Explore and Grow*, continue that development through the lesson while gaining procedural fluency during the *Think and Grow*, and then tie it all together with *Think and Grow: Modeling Real Life*. Every set of practice problems reflects this balance, giving students the rigorous practice they need to be college- and career-ready.

Major Topics in Grade 3

Operations and Algebraic Thinking

- Represent and solve problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- Multiply and divide within 100.
- Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Number and Operations—Fractions

- Develop understanding of fractions as numbers.

Measurement and Data

- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Geometric measurement: understand concepts of area and relate area to multiplication.

Use the color-coded Table of Contents to determine where the major topics, supporting topics, and additional topics occur throughout the curriculum.

- Major Topic
- Supporting Topic
- Additional Topic



1

Understand Multiplication and Division

	Vocabulary	2
■ Lesson 1.1	Use Equal Groups to Multiply	3
■ Lesson 1.2	Use Number Lines to Multiply	9
■ Lesson 1.3	Use Arrays to Multiply	15
■ Lesson 1.4	Multiply in Any Order	21
■ Lesson 1.5	Divide: Size of Equal Groups	27
■ Lesson 1.6	Divide: Number of Equal Groups	33
■ Lesson 1.7	Use Number Lines to Divide	39
	Performance Task	45
	Activity	46
	Chapter Practice	47

2

Multiplication Facts and Strategies

	Vocabulary	52
■ Lesson 2.1	Multiply by 2	53
■ Lesson 2.2	Multiply by 5	59
■ Lesson 2.3	Multiply by 10	65
■ Lesson 2.4	Multiply by 0 or 1	71
■ Lesson 2.5	Use the Distributive Property	77
■ Lesson 2.6	Problem Solving: Multiplication	83
	Performance Task	89
	Activity	90
	Chapter Practice	91

- Major Topic
- Supporting Topic
- Additional Topic

3

More Multiplication Facts and Strategies

	Vocabulary	94
■ Lesson 3.1	Multiply by 3	95
■ Lesson 3.2	Multiply by 4	101
■ Lesson 3.3	Multiply by 6	107
■ Lesson 3.4	Multiply by 7	113
■ Lesson 3.5	Multiply by 8	119
■ Lesson 3.6	Multiply by 9	125
■ Lesson 3.7	Practice Multiplication Strategies	131
■ Lesson 3.8	Multiply Three Factors	137
■ Lesson 3.9	More Problem Solving: Multiplication	143
	Performance Task	149
	Activity	150
	Chapter Practice	151

4

Division Facts and Strategies

	Vocabulary	156
■ Lesson 4.1	Use Arrays to Divide	157
■ Lesson 4.2	Relate Multiplication and Division	163
■ Lesson 4.3	Divide by 2, 5, or 10	169
■ Lesson 4.4	Divide by 3 or 4	175
■ Lesson 4.5	Divide by 6 or 7	181
■ Lesson 4.6	Divide by 8 or 9	187
■ Lesson 4.7	Divide by 0 or 1	193
■ Lesson 4.8	Practice Division Strategies	199
■ Lesson 4.9	Problem Solving: Division	205
	Performance Task	211
	Activity	212
	Chapter Practice	213
	Cumulative Practice	217
	STEAM Performance Task	221

5

Patterns and Fluency

■ Lesson 5.1	Identify Patterns in the Multiplication Table	225
■ Lesson 5.2	Use the Multiplication Table	231
■ Lesson 5.3	Complete Multiplication Tables	237
■ Lesson 5.4	More Problem Solving	243
	Vocabulary	224
	Performance Task	249
	Activity	250
	Chapter Practice	251

6

Relate Area to Multiplication

■ Lesson 6.1	Understand Area	255
■ Lesson 6.2	Measure Area Using Standard Units	261
■ Lesson 6.3	Find Area by Multiplying	267
■ Lesson 6.4	Area and the Distributive Property	273
■ Lesson 6.5	Find Areas of More Shapes	279
	Vocabulary	254
	Performance Task	285
	Activity	286
	Chapter Practice	287

7

Round and Estimate Numbers

■ Lesson 7.1	Vocabulary	290
■ Lesson 7.2	Place Value	291
■ Lesson 7.3	Round Numbers Using a Number Line	297
■ Lesson 7.4	Round Numbers Using Place Value	303
■ Lesson 7.5	Estimate Sums	309
	Estimate Differences	315
	Performance Task	321
	Activity	322
	Chapter Practice	323

8

Add and Subtract Multi-Digit Numbers

■ Lesson 8.1	Vocabulary	326
■ Lesson 8.2	Identify Addition Properties	327
■ Lesson 8.3	Use Number Lines to Add	333
■ Lesson 8.4	Use Mental Math to Add	339
■ Lesson 8.4	Use Partial Sums to Add	345
■ Lesson 8.5	Add Three-Digit Numbers	351
■ Lesson 8.6	Add Three or More Numbers	357
■ Lesson 8.7	Use Number Lines to Subtract	363
■ Lesson 8.8	Use Mental Math to Subtract	369
■ Lesson 8.9	Subtract Three-Digit Numbers	375
■ Lesson 8.10	Relate Addition and Subtraction	381
■ Lesson 8.11	Problem Solving: Addition and Subtraction	387
	Performance Task	393
	Activity	394
	Chapter Practice	395
	Cumulative Practice	399
	STEAM Performance Task	403

9

Multiples and Problem Solving

	Vocabulary	406
■ Lesson 9.1	Use Number Lines to Multiply by Multiples of 10	407
■ Lesson 9.2	Use Place Value to Multiply by Multiples of 10	413
■ Lesson 9.3	Use Properties to Multiply by Multiples of 10	419
■ Lesson 9.4	Problem Solving: Multiplication and Division	425
■ Lesson 9.5	Problem Solving: All Operations	431
	Performance Task	437
	Activity	438
	Chapter Practice	439

10

Understand Fractions

	Vocabulary	444
■ Lesson 10.1	Equal Parts of a Whole	445
■ Lesson 10.2	Understand a Unit Fraction	451
■ Lesson 10.3	Write Fractions of a Whole	457
■ Lesson 10.4	Fractions on a Number Line: Less Than 1	463
■ Lesson 10.5	Fractions on a Number Line: Greater Than 1	469
	Performance Task	475
	Activity	476
	Chapter Practice	477

11

Understand Fraction Equivalence and Comparison

	Vocabulary	482
■ Lesson 11.1	Equivalent Fractions	483
■ Lesson 11.2	Equivalent Fractions on a Number Line	489
■ Lesson 11.3	Relate Fractions and Whole Numbers	495
■ Lesson 11.4	Compare Fractions with the Same Denominator	501
■ Lesson 11.5	Compare Fractions with the Same Numerator	507
■ Lesson 11.6	Compare Fractions on a Number Line	513
■ Lesson 11.7	Compare Fractions	519
■ Lesson 11.8	Compare and Order Fractions	525
	Performance Task	531
	Activity	532
	Chapter Practice	533

12

Understand Time, Liquid Volume, and Mass

	Vocabulary	538
■ Lesson 12.1	Time to the Nearest Minute	539
■ Lesson 12.2	Measure Elapsed Time within the Hour	545
■ Lesson 12.3	Measure Elapsed Time Across the Hour	551
■ Lesson 12.4	Problem Solving: Time Interval Problems	557
■ Lesson 12.5	Understand and Estimate Liquid Volume	563
■ Lesson 12.6	Measure Liquid Volume	569
■ Lesson 12.7	Understand and Estimate Mass	575
■ Lesson 12.8	Measure Mass	581
	Performance Task	587
	Activity	588
	Chapter Practice	589
	Cumulative Practice	593
	STEAM Performance Task	597

13

Classify Two-Dimensional Shapes

■ Lesson 13.1	Identify Sides and Angles of Quadrilaterals	601
■ Lesson 13.2	Describe Quadrilaterals	607
■ Lesson 13.3	Classify Quadrilaterals	613
■ Lesson 13.4	Draw Quadrilaterals	619
	Vocabulary	600
	Performance Task	625
	Activity	626
	Chapter Practice	627

14

Represent and Interpret Data

■ Lesson 14.1	Read and Interpret Picture Graphs	631
■ Lesson 14.2	Make Picture Graphs	637
■ Lesson 14.3	Read and Interpret Bar Graphs	643
■ Lesson 14.4	Make Bar Graphs	649
■ Lesson 14.5	Make Line Plots	655
■ Lesson 14.6	Measure Lengths: Half Inch	661
■ Lesson 14.7	Measure Lengths: Quarter Inch	667
	Vocabulary	630
	Performance Task	673
	Activity	674
	Chapter Practice	675

15

Find Perimeter and Area

■ Lesson 15.1	Vocabulary	680
■ Lesson 15.2	Understand Perimeter	681
■ Lesson 15.3	Find Perimeters of Polygons	687
■ Lesson 15.4	Find Unknown Side Lengths	693
■ Lesson 15.5	Same Perimeter, Different Areas	699
	Same Area, Different Perimeters	705
	Performance Task	711
	Activity	712
	Chapter Practice	713
	Cumulative Practice	717
	STEAM Performance Task	721
	Glossary	A1
	Index	A11
	Reference Sheet	A25

