



TABLE OF CONTENTS

Start Quick and Ramp It Up! 4th Grade Algebraic Reasoning

ACTIVITY TYPE	ACTIVITY	TOPICS	PAGE
	Table of Standards		4
Quick Start	Beachville	Strip Diagrams & Equations in 1-Step Problems	7
Quick Start	Mixed Measures	Strip Diagrams & Equations in 1- & 2-Step Problems	16
Ramp Up	Cruising Along	Strip Diagrams & Equations in 1- & 2-Step Problems	24
Quick Start	Go Figure	Strip Diagrams & Equations in 1- & 2-Step Problems	30
Ramp Up	Tiger Tales	Strip Diagrams & Equations in 1- & 2-Step Problems	41
Ramp Up	Eric Steps Up	Strip Diagrams & Equations with Multi-Step Problems	54
Ramp Up	How Many?	Strip Diagrams & Equations with Multi-Step Problems	59
Ramp Up	Wonderful Wolves	Tables–Equations–Sequences	69
Ramp Up	Anchors Aweigh	Tables–Equations–Sequences	77
Ramp Up	Weigh In	Tables–Equations–Sequences	83
Ramp Up	Dogs, Dogs, Dogs	Tables–Equations–Sequences	92

Content and Instruction Extras

MEANING BEHIND THE MATH

A Brief Explanation of Strip Diagrams (4.IC)	8
Vertical Alignment: 4.5A	9
A Brief Explanation of Equations (4.IC)	16
Connecting Strip Diagrams and Equations (4.IE, 4.IF)	31
Strip Diagrams and Equations for One-Step and Two-Step Problems (4.IC)	42
Different Equations—Same Meaning (4.IF)	55
Input–Output Tables and Numerical Relationships (4.IE)	69
Vertical Alignment: 4.5B	70
Patterns in a Table (4.IF)	77
Connecting the Output, the Sequence, and the Position in the Sequence (4.IF)	83
Using Algebraic Reasoning to Build Operational Fluency (4.IF)	92
Keeping Meaning in Tables and Equations (4.IA, 4.IG)	92

READING, WRITING, AND SPEAKING TO IMPROVE CRITICAL THINKING

Sentence Frames for a Language-Rich Math Classroom (4.IG)	24
Debriefing After Math Activities (4.IG)	41

WORKING THE CLASSROOM

How Can Two Answers Both be Right? (4.IG)	41
Giving Students the Answers	55
Guidelines for Adapting Activities to Center Work	59



TABLE OF STANDARDS (PG. 1 OF 2)

The activities in this 4th grade Algebraic Reasoning book address the following standards.

Where are we going? Focus Standards		Activity
(4.5)	Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:	
4.5A	represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity. Readiness Standard	1 , 2 , 3 , 4 , 5 , 6 , 7
4.5B	Represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence. Readiness Standard	8 , 9 , 10 , 11

How will we get there? Working Standards		Activity
(4.4)	Number and operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. The student is expected to:	
4.4B	determine products of a number and 10 or 100 using properties of operations and place value understandings; Supporting Standard	1
4.4D	use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties; Supporting Standard	9 , 10 , 11
4.4F	use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor. Supporting Standard	9 , 10 , 11



TABLE OF STANDARDS (PG. 2 OF 2)

The activities in this 4th grade Algebraic Reasoning book address the following standards.

What kind of mathematical thinking will we use? Process Standards		Activity
(4.I)	Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	
4.IA	apply mathematics to problems arising in everyday life, society, and the workplace;	1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 , 11
4.IB	use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;	1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 , 11
4.IC	select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;	1 , 2 , 3 , 4 , 5 , 7 , 8 , 10 , 11
4.ID	communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;	1 , 2 , 3 , 4 , 5 , 6 , 7 , 8
4.IE	create and use representations to organize, record, and communicate mathematical ideas;	10 , 11
4.IF	analyze mathematical relationships to connect and communicate mathematical ideas.	1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 , 11
4.IG	display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	1 , 3 , 6 , 8 , 11