POWER BASICS Basic Mathematics

Teacher's Guide

WALCH®
MATHEMATICS

1 2 3 4 5 6 7 8 9 10

ISBN 0-8251-9346-0

J. Weston Walch, Publisher

40 Walch Drive • Portland, ME 04103

www.walch.com

Printed in the United States of America

Table of Contents

To the Teacher

Overview

Power Basics® is a complete textbook program designed to meet the needs of students who are daunted by the length and complexity of traditional textbooks. The goal of all textbook programs is to provide students with important new information. However, in traditional textbook programs, this goal is often overshadowed by other considerations. Many textbooks are written for the above-average reader and cover a wide range of content. They are filled with photographs, illustrations, and other visual elements. For some students, the amount of material is overpowering, the visual elements are distracting, and the rapid pace is unnerving. In Power Basics®, we revisited the basic goal, developing a streamlined textbook program that presents the essential content students need to succeed.

Program Components

As with traditional textbook programs, Power Basics® includes a core textbook and ancillary products designed to round out the program. The student text provides coverage of the essential content in each subject area. A consumable workbook provides a variety of activities for each lesson, including practice activities, extension activities, and activities designed for different learning styles.

The student text includes a collection of station-based activities that provide students with opportunities to extend beyond the mathematical skills and concepts they are learning. These station-based activities foster a collaborative learning experience, while allowing students the opportunity to reflect on and synthesize their thinking. These activities can be found near the end of the book.

Teacher support materials include a teacher's guide and test pack for each student text. The teacher's guide includes the following: an overview of each unit in the student text; suggestions for extension activities; the student text glossary and appendixes; a complete answer key to all practice activities and unit reviews in the student text; an overview/answer key for the station activities; classroom record-keeping forms; and graphic organizers for student use.

For more detailed assessments, the test pack offers a pretest, unit tests for each unit in the student text, a posttest, scoring keys, and test-taking strategies for students. Finally, a practice pack provides additional exercises with a separate answer key, organized by unit.

Student Book Organization

The student text is divided into units. Each unit contains a series of lessons on related topics, with one lesson for each topic. Each lesson begins with a clear, student-centered goal and a list of key words that are introduced in the lesson. The definitions for these words are included in the teacher material for each lesson.

Next comes a brief introduction to the topic of the lesson, followed by instructional text that presents essential information in short, easy-to-understand sections. Each section of instructional text is followed by a practice activity that lets students apply what they have just learned. A Unit Review is provided at the end of each unit to assess students' progress. The review is followed by an Application Activity that encourages students to extend and apply what they have learned.

The student text also includes several special features. "Tip" sections give students useful hints to help them remember specific pieces of information in the student text. "Think About It" sections ask students to use critical-thinking skills. "In Real Life" sections show students how the material they are learning connects to their own lives, answering the perennial question, "When am I ever going to use this?"

The reference section at the back of the student text includes a summary of rules and other important information presented in the text, a glossary (with pronunciation guide) that includes all vocabulary in the Words to Know sections, and an index to help students locate information in the text.

Record-Keeping Forms

To make record-keeping easier, we have provided reproducible class charts that you can use to track students' progress. Fill in your students' names, and make copies of the chart for each unit in the student text. Add lesson numbers, lesson titles, and practice numbers as needed. We have also provided a generic grading rubric for the Application Activities in the student text so that these activities may be assigned for credit, if you wish. You may customize the rubric by adding more grading criteria or adapting the criteria on the sheet to fit your needs.

We're pleased that you have chosen to Power Up your Basic Skills Curriculum with Power Basics®!

Guide to Icons

Teacher's Guide

Teaching Tips

Practical suggestions help you to engage students in the learning process.

Calculate It

Useful tips and tricks help students get the most from their calculators.

Mental Math

Oral math activities help learners develop strong mental arithmetic skills.

Differentiation

Different approaches to the content give all learners the opportunity to connect to the material.

Student Text

Tip

Tips give helpful hints to boost understanding and retention.

Think About It

These sections develop critical-thinking.

In Real Life

These features connect learning concepts to students' lives, answering the perennial question, "When am I ever going to use this?"

Workbook

Reinforcement

Reinforcement activities give students additional opportunities to practice what they have learned.

Multiple Intelligences

Different approaches capitalize on different learning styles and interests to help all students connect to the material.

Extension

Deepen and broaden learning with critical-thinking activities, real-life applications, and more.

Classroom Management

Student Name	Lesson No.: _____ Title: _____								
	Practice # __	Practice # __	Practice # __	Practice # __	Practice # __	Practice # __	Practice # __	Practice # __	Unit Review Score
1.									
2.									
3.									
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30.									

Application Activity Rubric

Name _____ Date _____

Unit _____ Activity _____

POINTS	4 all of the time	3 most of the time	2 some of the time	1 almost none of the time
followed directions				
organized material well				
used appropriate resources				
completed the entire activity				
showed an understanding of the content				
produced error-free materials				
drew logical conclusions				
where appropriate, listed sources used				

Use Chart

POWER BASICS WORKBOOK	STUDENT TEXT PRACTICE
Unit 1: Addition and Subtraction	
Activity 1: Addition 1	Practice 1: Addition
Activity 2: Magic Squares	Practice 1: Addition
Activity 3: Addition Bingo	Practice 1: Addition
Activity 4: Addition 2	Practice 5: Adding Three-Digit Numbers
Activity 5: Tug-of-War	Practice 4: Adding Two-Digit Numbers
Activity 6: Addition 3	Practice 7: Carrying
Activity 7: Estimating Addition 1	Practice 7: Carrying
Activity 8: Estimating Addition 2	Practice 7: Carrying
Activity 9: Adding Out Loud	Practice 7: Carrying
Activity 10: Perimeter Practice	Practice 5: Adding Three-Digit Numbers
Activity 11: Vending Machine Math	Practice 7: Carrying
Activity 12: Breaking the Code	Practice 7: Carrying
Activity 13: Solving One-Step Equations Using Addition	Practice 8: Word Problems
Activity 14: Subtraction 1	Practice 12: Subtracting Two-Digit Numbers
Activity 15: Number Code	Practice 12: Subtracting Two-Digit Numbers
Activity 16: Subtraction 2	Practice 13: Subtracting Numbers with Different Numbers of Digits
Activity 17: Estimating Subtraction	Practice 14: Subtracting Numbers with Borrowing
Activity 18: Subtraction 3	Practice 15: Borrowing Across Zeroes
Activity 19: Find the Missing Part	Practice 15: Borrowing Across Zeroes
Activity 20: Estimation and Exact Answers	Practice 16: Word Problems
Activity 21: Addition and Subtraction Puzzle	Practice 16: Word Problems
Activity 22: Tug-of-War with Subtraction	Practice 16: Word Problems
Activity 23: Solving One-Step Equations Using Subtraction	Practice 16: Word Problems
Unit 2: Multiplication and Division	
Activity 24: Multiplication Bingo	Practice 18: Multiplying by 1, Zero, and Multiples of 10
Activity 25: Partner Facts	Practice 19: Multiplying in Columns
Activity 26: Multiplication Chart	Practice 19: Multiplying in Columns]
Activity 27: Deciding Out Loud	Practice 20: Multiplying Larger Numbers by One-Digit Numbers
Activity 28: Multiplication 1	Practice 21: Multiplying with Carrying
Activity 29: Using Multiplication to Find Area	Practice 22: Multiplying by Two-Digit Numbers
Activity 30: Growing Volume	Practice 22: Multiplying by Two-Digit Numbers
Activity 31: Bringing Down the Zero	Practice 23: Multiplying by More than Two-Digit Numbers
Activity 32: Estimating Answers	Practice 23: Multiplying by More than Two-Digit Numbers
Activity 33: Multiplication 2	Practice 24: Word Problems

Use Chart, *continued*

POWER BASICS WORKBOOK	STUDENT TEXT PRACTICE
Activity 34: Write First	Practice 24: Word Problems
Activity 35: Keyword Scramble	Practice 24: Word Problems
Activity 36: Solving One-Step Equations Using Multiplication	Practice 24: Word Problems
Activity 37: Divisibility Rules	Practice 27: Using Multiplication to Divide
Activity 38: Number Code	Practice 28: Dividing by 1, Zero, or the Dividend
Activity 39: Find the Quotient 1	Practice 28: Dividing by 1, Zero, or the Dividend
Activity 40: Find the Quotient 2	Practice 33: Dividing by a Two-Digit Number
Activity 41: Estimating Quotients	Practice 33: Dividing by a Two-Digit Number
Activity 42: Think About It: Estimating	Practice 33: Dividing by a Two-Digit Number
Activity 43: Shorthand Division	Practice 34: Dividing Larger Numbers
Activity 44: Multiplication and Division Puzzle	Practice 37: Word Problems
Activity 45: Solving One-Step Equations Using Division	Practice 37: Word Problems
Unit 3: Fractions and Decimals	
Activity 46: Reducing Fractions	Practice 40: Reducing to Lowest Terms
Activity 47: Find the Better Buy	Practice 40: Reducing to Lowest Terms
Activity 48: Comparing Fractions	Practice 40: Reducing to Lowest Terms
Activity 49: Fractions 1	Practice 41: Improper Fractions and Mixed Numbers
Activity 50: Finding the GCF and LCM	Practice 45: Subtracting with Unlike Denominators
Activity 51: Fractions 2	Practice 46: Borrowing in Subtraction
Activity 52: To Borrow or Not to Borrow?	Practice 46: Borrowing in Subtraction
Activity 53: Fractions 3	Practice 47: Multiplying Fractions
Activity 54: Scale Drawings	Practice 49: Dividing Fractions
Activity 55: Unit Analysis	Practice 50: Word Problems
Activity 56: A Grading Dilemma	Practice 50: Word Problems
Activity 57: Solving One-Step Equations Using the Reciprocal	Practice 50: Word Problems
Activity 58: Fraction Rap	Practice 50: Word Problems
Activity 59: Fraction Puzzle	Practice 50: Word Problems
Activity 60: Comparing Decimals	Practice 51: Adding Decimals
Activity 61: Decimals 1	Practice 52: Subtracting Decimals
Activity 62: Decimals 2	Practice 54: Dividing Decimals
Activity 63: Draw It	Practice 54: Dividing Decimals
Activity 64: Find the Missing Piece	Practice 55: Adding Zeroes to the Dividend or the Quotient
Activity 65: Fractions and Equivalent Decimals	Practice 56: Writing Fractions as Decimals
Activity 66: Decimal Puzzle	Practice 56: Writing Fractions as Decimals
Activity 67: Unlimited Options?	Practice 57: Word Problems
Activity 68: What to Do with that Decimal?	Practice 57: Word Problems

Use Chart, *continued*

POWER BASICS WORKBOOK	STUDENT TEXT PRACTICE
Unit 4: Percents, Powers, and Roots	
Activity 69: Writing About History	Practice 58: Percent Concepts
Activity 70: Percents 1	Practice 60: Changing Percents to Fractions
Activity 71: Percent Increase or Decrease?	Practice 60: Changing Percents to Fractions
Activity 72: Pie Charts	Practice 60: Changing Percents to Fractions
Activity 73: Percent Decimal Chart	Practice 63: Changing Percents to Decimals]
Activity 74: Commission	Practice 64: Finding a Percent of the Whole
Activity 75: A Quick Way to Tip	Practice 64: Finding a Percent of the Whole
Activity 76: Sales Tax	Practice 64: Finding a Percent of the Whole
Activity 77: Simple Interest	Practice 65: Finding the Whole
Activity 78: Percent Puzzle	Practice 65: Finding the Whole
Activity 79: Unscramble the Letters	Practice 65: Finding the Whole
Activity 80: Solving Percent Problems Using Proportions	Practice 65: Finding the Whole
Activity 81: Solving Percent Problems Using Mathematical Sentences	Practice 65: Finding the Whole
Activity 82: Zero Power	Practice 69: Exponents with Zero, 1, and Negative Numbers
Activity 83: Multiplying Negative Numbers	Practice 70: Simplifying Expressions
Activity 84: Scientific Notation	Practice 70: Simplifying Expressions
Activity 85: Powers and Roots	Practice 71: Evaluating Numbers with Exponents
Activity 86: What Went Wrong?	Practice 71: Evaluating Numbers with Exponents
Activity 87: Matching the Steps	Practice 71: Evaluating Numbers with Exponents
Activity 88: Write to Remember	Practice 71: Evaluating Numbers with Exponents
Activity 89: Using Factor Trees to Find Square Roots	Practice 72: Solving for Perfect Squares and Square Roots
Activity 90: Defend Your Choice!	Practice 72: Solving for Perfect Squares and Square Roots
Activity 91: Powers and Roots Puzzle	Practice 73: Square Roots
Activity 92: Pythagorean Theorem	Practice 73: Square Roots

Unit 1: Addition and Subtraction

This unit presents the operations of addition and subtraction. In Lesson 1, students learn the basics of addition, how to add in columns, adding multi-digit numbers, carrying, and how to identify and solve word problems involving addition. In Lesson 2, they learn about subtraction, including subtracting in columns, checking answers, subtracting numbers with different numbers of digits, borrowing, and how to identify and solve word problems involving subtraction.

Lesson 1—Addition

Goal: To review the addition of numbers to four digits with carrying, and to use addition in word problems

WORDS TO KNOW

carry	when the sum of a column is more than 9, to move numbers from that column to the column of the next greater place value
column	numbers lined up vertically (up and down)
digit	any one of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, which are used to represent numbers
equal sign	a sign used in place of the words "is equal to." The sign looks like this: = .
plus sign	a sign used to mean add. It looks like this: +.
row	numbers lined up horizontally (across)
sum	the answer to an addition problem
total	the answer to an addition problem; another word for sum

Lesson 2—Subtraction

Goal: To review subtraction, including borrowing, and to use subtraction in word problems

WORDS TO KNOW

commutative property	mathematical property that says that changing the order of the numbers to be added or multiplied doesn't change the answer
difference	the answer in a subtraction problem
minuend	in a subtraction problem, the number that is being reduced, or subtracted from; in 4 – 1, the minuend is 4.

minus sign a sign used to show that the number after the sign is to be subtracted. It looks like this: – .

place value the value of a digit within a number is shown by where it is placed in the number, that is, whether it stands for ones, tens, hundreds, thousands, and so forth.

subtraction mathematical operation in which one number is taken away from another

subtrahend in a subtraction problem, the number to be subtracted, or taken away, to find the difference between two numbers; in 7 – 5, the subtrahend is 5.

Notes on Application Activities in Student Text

Activity	Skills Applied	Product
A New Checking Account	gathering information critical thinking computation skills	completed chart written opinion
Counting Animals	gathering information critical thinking computation skills	completed chart written conclusion
Your Monthly Budget	gathering information computation skills	completed chart

Additional Activity Suggestions

- Have learners visit the admissions office of a nearby college or junior college they might consider attending. Have them gather information on the costs of attending the school (including tuition, fees, books, dormitory housing if applicable, meals, parking permits, and so on) and find the total cost. They can also learn the number of credits needed to graduate and how much the courses they would want to take count toward the total.

- Have learners visit a local food bank or soup kitchen to learn the total cost of providing such a service. They should ask about the renting of the space and the cost of the food (including the approximate value of donated food), paper goods, cleaning service, paid staff (if any), and liability insurance. Have them total the expenses and research how much of the money needed comes from organized charities (such as the United Way) and other sources. Learners may be able to suggest additional ways to procure donated food, labor, or money for the pantry or kitchen.

- Ask learners with access to cars to visit a service station for a tune-up. They should find out the basic rate and also inquire about "extras" that add to the cost. Which extra services seem legitimate, and which seem like padding? What is the total cost of the desired services? Learners without access to a car might team up with those who do; they might also complete the same assignment with a bicycle at a bicycle shop.

- Have learners attend a town meeting, city council meeting, or their church's annual meeting to observe and participate in budget discussions. Most such meetings are open to observers. Learners could prepare for the meeting by interviewing the town or county planner or comptroller (titles vary but basically they're looking for the financial officers). Learners should also obtain a copy of the proposed budget to study. If there is a desire to take this idea further, you could have an in-class debate about a municipal budget.

Mental Math

- Addition and subtraction lend themselves well to lively classroom games. One easy idea is to split your learners into two teams. Then present the teams with a series of addition and subtraction problems. Learners should not use paper, pencils, or calculators—all math should be done in their heads. The first person to call out each correct answer wins a point for his or her team. You can vary the game by adding a third team. Each team then takes a turn providing addition and subtraction problems for the other two teams to solve in their heads.

Differentiation

- As you present new concepts, demonstrate them on the board or overhead, using metacognitive strategies to explain out loud what you are thinking and doing throughout the process.
- For learners who find it difficult to think abstractly, use manipulatives to demonstrate the principles of addition.
- Give students pages from catalogs with items they are likely to find appealing, such as electronics, CDs, DVDs, and so forth. Have students work individually or in small groups to choose items from the catalog and add their cost. You may ask students to choose a certain number of items and add their prices to find the total cost, or ask them to find a minimum of three items that add up to a certain dollar value. You may want to specify whether they should include or omit tax and shipping costs in their calculations.
- To help students recall important new terms, use the Words to Know and definitions from each lesson to prepare crossword puzzles or matching activities.
- Ask students to brainstorm a list of all the ways they use addition in their daily lives. If you like, write the list on a corner of the board or on newsprint and post it in the classroom as a reminder.

Unit 2: Multiplication and Division

This unit presents the operations of multiplication and division. Multiplication is presented in Lesson 3, including the basics of multiplication, multiplying in columns, multiplying by 1, 0, and multiples of 10, multiplying with carrying, identifying and solving word problems that use multiplication, and word problems that call for more than one operation. Division is presented in Lesson 4, including the basics of division, dividing by 1, 0, or the dividend, checking answers, zeroes as placeholders, division with remainders, and identifying and solving word problems that use division as well as word problems with mixed operations.

Lesson 3—Multiplication

Goal: To review multiplication skills and word problems using multiplication

WORDS TO KNOW

factors	numbers that are multiplied together to get a product
multiplication	mathematical operation that is a short way of adding a certain number to itself the number of times indicated by the second number; for example, $3 \times 4 = 12$ is the same as $3 + 3 + 3 + 3 = 12$.
multiplication sign	a sign used to mean multiply. It looks like this: $\times$.
partial product	when multiplying by a number with more than one digit, the product of one digit; all partial products must be added to find the total product.
product	the answer to a multiplication problem

Lesson 4—Division

Goal: To review division skills and word problems using division

WORDS TO KNOW

dividend	in a division problem, the number that is to be divided; in $42 \div 6$, the dividend is 42.
division	mathematical operation that determines how many times a number can go into another number
division sign	a sign used to mean divide; it has two different forms: $\div$ and $)\overline{\quad}$.
divisor	in a division problem, the number by which another number is to be divided; in $42 \div 6$, the divisor is 6.

quotient the answer you get when one number is divided by another (the answer to a division problem)

Notes on Application Activities in Student Text

Activity	Skills Applied	Product
Shopping for the Best Value	gathering information critical thinking computation skills	completed chart written opinion
The Cost of a Pet	gathering information computation skills	completed chart

Additional Extension Activity Suggestions

- Have learners contact the Social Security Administration to find out what is in their Social Security accounts. Although conditions change, they may be able to extrapolate their total lifetime benefits from the information they receive—or at least estimate them.

- Have learners investigate the cost of subscribing to a magazine or newspaper. If a price is given for a whole year, what is the cost per week? per month? Is a discount or benefit offered for subscribing for an extended term?

- Have learners plan a road trip of at least one day. (Helpful resources include the Internet and AAA, if students or their parents are members.) Using a map, they should calculate the time the full trip will take (traveling at posted speeds), as well as the length of each leg between stops. They should also determine how much fuel they will need for the trip and factor in other expenses, such as tolls or ferry crossings.

- Have students review electricity, gas, and/or telephone use in their homes. (If they are not on their own, their parents would probably be able to provide them with copies of the bills.) It would be ideal if a year's worth were available. What is the average cost per month of service? What is the total annual cost of service?

Teaching Tips

- Word problems are the place where language literacy and math literacy meet. Word problems that require performing two or more different operations to obtain the final answer can overwhelm learners. Encourage students to follow the steps to extract numbers from problems

by looking for key words such as a, an, each, double, annually, monthly, average, and so forth. Then they must read carefully to find out which kinds of operations to perform, and in what order. Read through and analyze a number of word problems with your learners. Emphasize the real-world applications of word problems, and ask learners to talk about tasks they've performed that could be translated into word problems. Encourage each learner to write his or her own word problem from real life.

Differentiation

- Use manipulatives to demonstrate the principles of multiplication and division.
- Use the overhead projector to demonstrate using a multiplication table to multiply numbers from 1 to 12. Then have students work in pairs to practice using the table. Students take turns naming a pair of numbers to multiply and using the table to find the product.
- To help students recall important new terms, use the Words to Know and definitions from each lesson to prepare crossword puzzles or matching activities.
- Use newsprint to make a chart with the rules of divisibility from page 31 of Appendix A. Post the chart on the wall and encourage students to use the tips to estimate quotients before they do division. This will help them tell if their answers are correct.
- Many students find word problems difficult to "translate" into math problems. Encourage students to use number lines and drawings to help them "see" what word problems are really asking.