

Table of Contents

Introduction	3	Number & Operations—Fractions	52
How to Use This Book	4	Pumpkin Bars	52
The Path to Common Core Success: A Parent's Guide	6	Arena Football	55
Operations & Algebraic Thinking	7	Hummingbirds	58
Wolves & Coyotes	7	Troy's Spaghetti Sauce	61
My Shadow	10	Wilma Rudolph: Overcoming to Win	64
Matthew Henson: A Frozen Frontier	13	John Napier: The Decimal Point	67
Jack S. Kilby: Inventor of the Microchip .	16	Buckets of Rain	70
Grand Canyon Adventure	19	Measurement & Data	73
A Walk Through the Neighborhood	22	Paul Bunyan	73
Freeway Art	25	Race to the Finish	76
Number & Operations in Base Ten	28	Traveling to School	79
The Transcontinental Railroad	28	Sand Dunes	82
Amaranth: An Edible Weed	31	Small Town U.S.A.: North Pole, Alaska .	85
The Mighty Mississippi	34	Geometry	88
The Gettysburg Address	37	Optical Illusions	88
The Eagle	40	Sundials	91
Montana Sapphires	43	Cozy Quilts	94
Razor Clams	46	Gulliver's Travels	97
China's Ghost City	49	Urban Symmetry	100
		Answer Key	103
		Meeting Standards	107

Introduction

Approaching Math Content— Today's Standards

The Common Core State Standards address several important goals in education:

- to prepare students for college and careers
- to develop critical-thinking and analytical skills students need for success
- to help teachers measure student progress and achievement throughout the year

The Common Core Mathematics Standards seek to provide teachers and students with focused mathematics instruction. The standards are designed to deepen students' understanding as they progress through grade levels and topics.

Mathematics is a subject in which concepts build in a progression. A strong foundation of basic concepts must be laid, beginning in the early grades. The Common Core State Standards recognize this learning sequence. Mathematical thinking is divided into several broad categories, referred to as “domains.” Elementary grades address the same general domains, with specific standards for student understanding and achievement within each domain. For grades 1–5, these domains include Operations & Algebraic Thinking, Number & Operations in Base Ten, Number & Operations—Fractions (begins in grade 3), Measurement & Data, and Geometry.

It is important for students to understand the role mathematics plays in everyday life. The Common Core Mathematics Standards encourage students to apply their mathematical knowledge to real-world problems and situations. Teachers, in turn, assess student understanding and mastery of concepts by asking them to explain their thinking and justify their answers. Word problems provide students with opportunities for the practical application of mathematical concepts.

This book presents word problems in a realistic setting. Students dig into the content of each “scenario” as they apply math concepts to solve multiple problems. Each unit is designed to encourage students to read for understanding, revisit content on a variety of levels, and use information as a tool for solving more complex problems.

Establishing Mathematical Practices

The Common Core Standards for Mathematical Practice (SMP) describe practices students can implement to help them engage with mathematical content. As your students work through the activities in this book, encourage them to develop these habits as they practice and develop problem-solving skills.

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

These practices help students understand core mathematical concepts so they can apply a variety of strategies for successful problem solving. As students learn underlying principles, they will be able to . . .

- consider similar problems.
- represent problems in ways that make sense.
- justify conclusions and explain their reasoning.
- apply mathematics to practical situations.
- use technology to work with mathematics.
- explain concepts to other students.
- consider a broad overview of a problem.
- deviate from a known procedure to use an appropriate shortcut.
- reason and explain why a mathematical statement is true.
- explain and apply appropriate mathematical rules.

Help your students and their families find success. Work with administrators, other teachers, and parents to plan and hold math-coaching nights for parents. The tips on page 6 may be helpful for parents as they work with students at home. Consider photocopying the page to send home in students' homework folders to aid with math assignments. Additionally, prepare a visual aid to help parents understand students' work in math. Share this aid with parents at back-to-school night or on other occasions when they visit the classroom.

How to Use This Book

This book contains several mathematical problem-solving units. Each unit gives students the opportunity to practice and develop one or more essential mathematical skills. Units are grouped by domains—although within a unit, more than one domain may be addressed. Within each domain, math concepts build on one another, forming a foundation for student learning and understanding. In addition to the Common Core Mathematics Standards covered in this book, the passages that accompany each unit meet one or more English Language Arts Standards as they provide practice reading appropriate literature and nonfiction text.

About the Units

Each unit is three pages in length. Depending on the needs of your students, you may wish to introduce units in small-group or whole-class settings using a guided-to-independent approach. Reading the passages and responding to activities in collaborative groups allows students to share and support their problem-solving results.

As an alternative, students can work independently and compare responses with others. Whichever method you choose, the reading and math activities will provide students with the tools they need to build mathematical knowledge for today's more rigorous math standards.

Page 1

All units begin with a reading passage that presents a mathematical problem or situation. Engaging nonfiction and fiction passages are included in the book. Passages are age-level appropriate and fall within a range of 740 to 940 on the Lexile scale.

Each passage incorporates information to be used for solving practical math problems. They also allow students to experience a variety of genres and make meaningful connections between math and reading.

Students practice reading skills as they read for understanding, revisit text on a variety of levels, and use passage information as a tool for solving more complex problems.

Sidebars provide tips to help students think about how to do the math. In addition, they offer tools or strategies students can use throughout the problem-solving process.

NAME _____ DATE _____

Number & Operations in Base Ten


Amaranth: An Edible Weed

Amaranth is a grain-like plant that is grown in various parts of the world for use as a cereal grain or vegetable. The name means "never fading," which describes this hardy plant well. It has spread around the world and can adapt to low-water conditions. This makes it a valuable food crop in many places. However, it is also resistant to weed-control chemicals.

Cultivated amaranth plants reach a size of 5 to 6 feet. Some plants grow up to 3 inches per day! One variety commonly grown for eating has reddish stems and oval leaves. Its common name is *pigweed*. One species can produce up to one million seeds per plant. One statistic shows that in 2002, ten farms cultivated a total of 939 acres of amaranth. Other estimates suggest as many as 200,000 acres or more were in production. In the United States, it is mostly grown in the Midwest.

Natives in Mexico and South America cultivated amaranth between 6,000 and 8,000 years ago. People in South America still pop amaranth seeds like popcorn today. Sometimes it is mixed with honey for a tasty snack. It is used for traditional breakfast porridge in India, Mexico, and Peru. Native Americans in the United States also use it as a grain. They grind the seeds and make a mush with goat's milk. Ground seeds may be mixed with corn flour and made into bread. The seeds can also be threshed, made into dough, and baked in hot ashes. The greens may be boiled or fried in grease.

Amaranth is not a true grain but has similar nutrients to cereal grains. It is also prepared to be eaten in the same ways as grains. Some species produce thousands of edible seeds, which can be prepared in different ways. The seeds are high in protein and other nutrients. Most importantly for some people, amaranth is a naturally gluten-free food.



THINK ABOUT THE MATH

- A digit in one place represents ten times what it represents in the place to its right.
- A million is the place value to the left of hundred thousand.
- We use place value to compare multi-digit numbers.
- There are 100 years in a century.
- Say a number aloud to write the words for the number.
- Use comparison symbols ($>$, $=$, and $<$) to compare two multi-digit numbers.

©Teacher Created Resources 31 #8389 Real-World Math Problem Solving

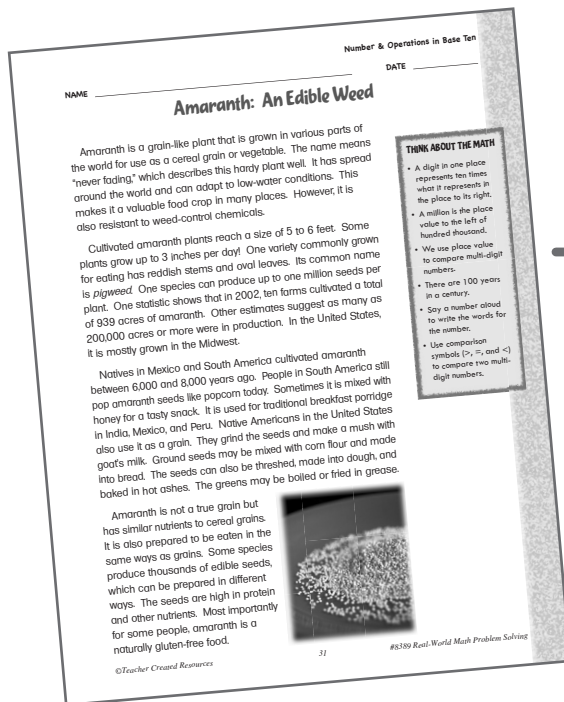
How to Use This Book (cont.)

About the Units (cont.)

Page 2

The second page of each unit introduces problem-solving tasks. Space is provided for students to draw pictures, work out their answers, write equations, show their work, and explain their thinking. Students are asked to use the unit passage to respond to reading content and investigate the text in order to find solutions to the problems on the page.

The questions require students to look back at the text for clues and information that relates to each question. They must then interpret this information in a way that helps them solve each task on the page. In doing so, students learn to support their responses with concrete evidence.



Number & Operations in Base Ten

Amaranth: An Edible Weed

NAME _____ DATE _____

Problem Solving Directions: Use page 31 to answer these questions. First skim the paragraphs to find information that might help you solve the problem. Remember to show your thinking as you do the math!

- 1 Write a number (in word form) to describe how long ago the maximum amount of amaranth was first cultivated.
- 2 How many centuries ago did people in South America first cultivate amaranth?
- 3 Write a base-ten numeral to indicate the number of seeds one plant can produce.
- 4 How many acres of amaranth were cultivated in 2002?
If each farm grew the same amount of amaranth, how many acres of amaranth did each farm grow (to the nearest acre)?
- 5 How many days would it take a fast-growing pigweed plant to reach a height of 6 feet?
- 6 Write a true number sentence (using $>$, $<$, or $=$), comparing the two estimates of amaranth produced in 2002.

#8389 Real-World Math Problem Solving 32 ©Teacher Created Resources

Page 3

The *Engage* option extends the mathematical situation with questions that allow students to look back at the reading passage and use critical-thinking skills.

The activities in this section strengthen students' comprehension skills by posing questions or situations for which further reflection of the text is required. Questions may be open-ended and require higher-level thinking skills and supported responses. Activities in this section focus on a combination of reading and math skills.

While students can respond independently to the activities on this page, you may wish to have them discuss their answers with a partner, in a small group, or with the entire class. This method can also provide closure to the unit.

Amaranth: An Edible Weed

Number & Operations in Base Ten

NAME _____ DATE _____

Engage Directions: Use the passage on page 31 and other available resources to explore and discuss uses of amaranth with classmates.

- 1 Why do you think a common name for the plant is *pigweed*?
- 2 Why is this plant a good source of food for people?
- 3 Why might amaranth be a problem for farmers?
- 4 Research to find ways people cook and use amaranth today. Take notes in the box.
- 5 What do you think would be your favorite way to try eating amaranth? Why?

©Teacher Created Resources 33 #8389 Real-World Math Problem Solving

NAME _____

DATE _____

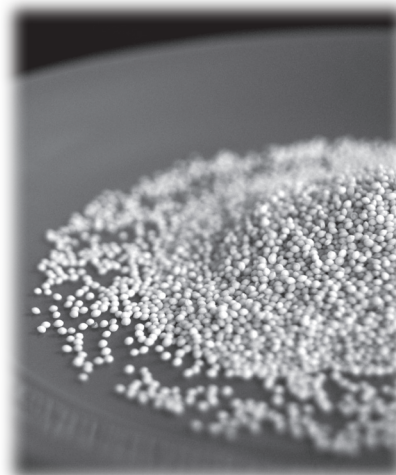
Amaranth: An Edible Weed

Amaranth is a grain-like plant that is grown in various parts of the world for use as a cereal grain or vegetable. The name means “never fading,” which describes this hardy plant well. It has spread around the world and can adapt to low-water conditions. This makes it a valuable food crop in many places. However, it is also resistant to weed-control chemicals.

Cultivated amaranth plants reach a size of 5 to 6 feet. Some plants grow up to 3 inches per day! One variety commonly grown for eating has reddish stems and oval leaves. Its common name is *pigweed*. One species can produce up to one million seeds per plant. One statistic shows that in 2002, ten farms cultivated a total of 939 acres of amaranth. Other estimates suggest as many as 200,000 acres or more were in production. In the United States, it is mostly grown in the Midwest.

Natives in Mexico and South America cultivated amaranth between 6,000 and 8,000 years ago. People in South America still pop amaranth seeds like popcorn today. Sometimes it is mixed with honey for a tasty snack. It is used for traditional breakfast porridge in India, Mexico, and Peru. Native Americans in the United States also use it as a grain. They grind the seeds and make a mush with goat's milk. Ground seeds may be mixed with corn flour and made into bread. The seeds can also be threshed, made into dough, and baked in hot ashes. The greens may be boiled or fried in grease.

Amaranth is not a true grain but has similar nutrients to cereal grains. It is also prepared to be eaten in the same ways as grains. Some species produce thousands of edible seeds, which can be prepared in different ways. The seeds are high in protein and other nutrients. Most importantly for some people, amaranth is a naturally gluten-free food.



THINK ABOUT THE MATH

- A digit in one place represents ten times what it represents in the place to its right.
- A million is the place value to the left of hundred thousand.
- We use place value to compare multi-digit numbers.
- There are 100 years in a century.
- Say a number aloud to write the words for the number.
- Use comparison symbols ($>$, $=$, and $<$) to compare two multi-digit numbers.

NAME _____

DATE _____

Problem Solving

Directions: Use page 31 to answer these questions. First, skim the paragraphs to find information that might help you solve the problem. Remember to show your thinking as you do the math!

- 1 Write a number (in word form) to describe how long ago the maximum amount of amaranth was first cultivated.

- 2 How many centuries ago did people in South America first cultivate amaranth?

- 3 Write a base-ten numeral to indicate the number of seeds one plant can produce.

- 4 How many acres of amaranth were cultivated in 2002? _____

If each farm grew the same amount of amaranth, how many acres of amaranth did each farm grow (to the nearest acre)?

- 5 How many days would it take a fast-growing pigweed plant to reach a height of 6 feet?

- 6 Write a number sentence (using $>$, $<$, or $=$), comparing the two estimates of amaranth produced in 2002.

NAME _____

DATE _____

Engage

Directions: Use the passage on page 31 and other available resources to explore and discuss uses of amaranth with classmates.

1 Why do you think a common name for the plant is *pigweed*? _____

2 Why is this plant a good source of food for people? _____

3 Why might amaranth be a problem for farmers? _____

4 Research to find ways people cook and use amaranth today. Take notes in the box.

5 What do you think would be your favorite way to try eating amaranth? Why?
