WORD PROBLEMS from Literature

Help Students Master Problem Solving in Elementary to Middle School Math

This annotated pdf file contains my notes for the *Word Problems from Literature Audio Commentary*, in case you'd rather read than listen.

If you have any questions or comments, I'd love to hear from you! It makes this more of a conversation.

The best way to reach me is by email: letsplaymath@gmail.com.

Or you can use the secure contact form on my blog: DeniseGaskins.com/about.

Books by Denise Gaskins

Let's Play Math: How Families Can Learn Math Together—and Enjoy It

Math You Can Play Series

Counting & Number Bonds
Addition & Subtraction
Math You Can Play Combo
Multiplication & Fractions
Prealgebra & Geometry

Playful Math Singles Series

Let's Play Math Sampler
70+ Things To Do with a Hundred Chart:
Word Problems from Literature
Word Problems Student Workbook
312 Things To Do with a Math Journal

The Adventurous Student Journals Series

Printable Activity Guides for Teachers and Homeschoolers

A PLAYFUL MATH SINGLE

WORD PROBLEMS *from Literature*

Help Students Master Problem Solving in Elementary to Middle School Math

SECOND EDITION

Denise Gaskins

Tabletop Academy Press

One of the changes I made for the second edition is to replace the old subtitle.

Thanks to questions from readers and the support of my Kickstarter backers, this book has grown far beyond my original vision of "an introduction to bar model diagrams."

I still demonstrate how to use the diagrams, but they are just one tool in your child's problem-solving arsenal.

This book began as a series of blog posts way back in 2007, which I compiled into the first edition of *Word Problems from Literature* in 2017. So this new version is the 5-year anniversary edition.

This was the first book of my "Playful Math Singles" series to hit publication. I thought of these books as a nonfiction version of short stories or novellas—very short books of practical tips and ready-to-play activities.

Well, I'm still aiming for practical and ready-to-play, but I never really managed the "short" part of that goal.

At any rate, I hope you'll find all 220 pages fun and useful!

Tabletop Academy Press, Boody, IL, USA
tabletopacademy.net

Print version 2.0

Contents

Whoops! My table of contents almost ran out of room!

Preface to the Second Edition

As a math coach, I love showing adults and children how to look at math with fresh eyes, to explore the adventure of learning math as mental play, which is the essence of creative problem-solving. Mathematics is not just rules and rote memory. Math itself is a game, playing with ideas.

I've written several books to help families play math together. But at heart, I've always been a fiction fan—especially fantasy fiction. And this book, *Word Problems from Literature,* lets me bring that love of story to the surface.

This is one of my all-time favorite books, and I've had so much fun with this new edition: adding stories, writing make-your-own-problem prompts, sneaking extra teaching tips into the worked-out solutions, creating an almost-magical guide to helping kids reason their way through math problems.

To provide support when your children get stuck, I added my favorite problem-solving tip, the Four Questions that push students to apply their own common sense, emphasizing the importance of reasoning about math. And to give you a boost when *you* get stuck, I beefed up the explanations of the advanced puzzles, adding several tips on understanding and teaching fraction division and other monster calculations.

There's a new section in the student workbook on "What If I'm Not Good at Math?" to help children develop a problem-solving mindset. Plus, I wrote more than 30 new word problem prompts to get your students writing their own creative math stories.

Most of all, I've tried as much as possible to encourage both

Many people discover my books when they're looking for math games. I love using games to replace worksheet practice.

But I also want to encourage people to see math itself as a playful adventure, a place where we can explore and experiment with ideas about numbers, shapes, and patterns.

Our school experience taught most adults to think that math is the rules and *algorithms* (step-by-step recipes for pencil-and-paper calculations).

No! Math is reasoning and figuring things out. Math happens in our heads, not on the paper.

The algorithms are a crutch or short-cut to avoid thinking. All you have to do is to follow the steps, and the answer pops out like magic.

That's why we can get a computer to do calculations. It doesn't have to understand the meaning of what it does.

When you tell a student to follow steps to get an answer, you are asking them to act like a computer instead of a human.

Instead, try asking them what they think about the problem. How can they use the things they already know to figure it out?

And play with the ideas. Twist them, turn them around, try something new, or try something old in a new way.

That's what math is all about!

adults and students to work at making sense of the math, seeing how the numbers relate, avoiding the crutch of standard textbook rules so you can experience the joy of figuring things out for yourself.

Those of us who made it through school math by memorizing and following rules eventually paid the price. We came to the point where our minds could hold no more, where the rules we had learned all jumbled together, where we felt lost in the dark as the rock began to crumble beneath our metaphorical feet while the wizard rammed his staff into the ground and cried, "You shall not pass!"

Some people reach the point of mental exhaustion with upper-elementary fractions or middle school ratios and percents, while others make it into algebra or geometry before they crash. A rare few have a good enough mental filing system that they can proceed as far as calculus before it all falls apart.

Estimates vary, but anywhere from half to three-fourths of adults suffer from some level of math anxiety due to their school experience.

Can we spare our children this fate?

We must strive to teach math in a way that makes sense, where children don't just memorize the rules we tell them but see clearly how math concepts connect, drawing their own conclusions, building their understanding into a solid foundation for future learning.

And we must give our students the tools to build on this foundation, problem-solving tools that will help them face and conquer any new math monster that comes their way.

This book will help you do that.

Have fun playing math with your kids!

—*Denise Gaskins,*
rural Illinois, July 2022

Storying—
encountering the world
and understanding it contextually
by shaping ideas,
facts,
experience itself
into stories—
is one of the most fundamental means
of making meaning.
As such, it is an activity
that pervades all learning.

—Gordon Wells

When I first read this quote about storying, I understood why the Story Problem Challenge in Chapter 9 works so well.

As students make up their own math problems, they harness the power of storying to help them experience the meaning of mathematical relationships.

Word Problems as Mental Manipulatives

A manipulative is a hands-on item like a block or counter that helps us think about a math concept.

Word problems do the same thing, turning abstract ideas into something we can picture in our minds.

Paul Halmos was a Hungarian-American mathematician and teacher.

He also wrote a tip for students about how to approach math problems:

"Don't just read it; fight it! Ask your own questions, look for your own examples, discover your own proofs."

Facts sit on the surface of our minds, but problems force us to grapple in a deeper way with the ideas we are trying to learn.

It is the duty
of all teachers,
and of teachers of mathematics
in particular,
to expose their students
to problems
much more than to facts.

—Paul Halmos

1

Puzzles Build Mathematical Thinking

Archimedes tried to find the distance around a circle and almost discovered calculus. Pierre de Fermat predicted the result of a gambling game and laid the foundations of probability. Leonhard Euler went for an afternoon walk over the bridges of Königsberg and invented topology. Georg Cantor created a way to count infinity and opened a whole new world of modern math.

Through the centuries, mathematics has grown as mathematicians struggled with and solved challenging puzzles.

Problems are the raw material of math, the ore we dig, grind up, and melt, refining it to produce ideas. Our understanding of math grows as we play with problems, puzzle them out, and look for connections to other situations. The threads that connect these problems become the web of ideas we call mathematics. Each puzzle we solve adds a new thread to the web, or strengthens one that already exists, or both.

Real mathematics is not the symbols we write on paper as we try to solve problems.

Real mathematics is the web of interconnected ideas we construct in our minds.

If we want our children to learn real math, we need to offer them plenty of problems to solve. A child may work through several pages of number calculations by rote, following memorized steps, but a good problem demands more thought.

The story in a word problem puts flesh on the abstract bones of arithmetic, encouraging children to ponder what it means

This quote from Herb Gross reminds me of an early math memory, standing in the lunch line (maybe 6th grade) and hearing some kids behind me complain that they hated math story problems.

I just couldn't understand that attitude. Even back then, I saw word problems as puzzles, like the mini-mystery books I loved to read.

for one thing to be bigger than another, or smaller, or faster, or slower, or made up of several parts.

Math professor Herb Gross says: "We teachers so often hear students summarize a course by saying, 'I could do everything except the word problems.' Sadly, in the textbook of life, there are only word problems."

Our children will meet numbers in many guises throughout their lives. Few of these will be as straight-forward as a textbook word problem, but real-life problems and school math stories will always have certain things in common. Quantities will be related to each other in a given proportion. Situations will be complex, and solutions may require many steps.

Story problems give students a chance to grapple with these complexities in a controlled environment, where we can increase the difficulty in stages over several years.

The Purpose of Word Problems

Word problems feed a student's imagination. Like other puzzles, word problems are often artificial, but that needn't diminish our pleasure in solving them.

In working a puzzle, we expect to find difficulties and setbacks. That's part of the game. Similarly, when students approach word problems as puzzles, they become less concerned with rushing to an answer and more interested in figuring out the relationships within the story.

Playing with puzzles strengthens mathematical understanding, according to retired professor Andre Toom. Originally from Russia, Toom taught math in several colleges and universities around the world.

Here's how he explains the purpose of story problems:

> "Word problems are very valuable—not only to master mathematics, but also for general development.

"Especially valuable are word problems solved with minimal scholarship, without algebra, even sometimes without arithmetic, just by plain common sense. The more naive and ingenuous is the solution, the more it provides the child contact with abstract reality and independence from authority, the more independent and creative thinker the child becomes.

"When we teach children to solve problems in school, we do not expect them to meet exactly and literally the same problems in later life. Mathematical education would be next to useless if its only use were literal. We want much more, we want to teach children to solve problems in general.

"In this respect traditional word problems are especially valuable, because to solve a word problem, you have to understand what is said there.

"This function of word problems is very poorly understood. The main educative value of word problems is that they serve as mental manipulatives, paving children's road to abstract thinking.

"For example, coins, nuts, and buttons are clearly distinct and countable, and for this reason are convenient to represent relations between whole numbers. The youngest children need some real, tangible tokens, while older ones can imagine them, which is a further step of intellectual development. That is why coin problems are so appropriate in elementary school.

"Pumps and other mechanical appliances are easy to imagine working at a constant rate. Problems involving rate and speed should be common already in middle school. Trains, cars, and ships are so widely used in textbooks not because all students are expected to go into the transportation business, but for another, much more

I can't count the number of times I've heard people—even teachers—complain about "unrealistic" word problems.

Word problems are puzzles. They don't need to be realistic, only to be puzzling.

We don't use water pumps (for example) in math problems beacuse we expect all our students to become plumbers.

We use trains, planes, cars, pumps, and so on, to help students mentally manipulate abstract ideas like *rate* (speed) and *acceleration.*

These ideas do have real-life applications, but the word problems are not about real life.

They are about the puzzle: "How does this idea work?"

I think the key to helping our children solve word problems is what Toom says here. We need to reach their creative imagination.

That's one reason I love using word problems from literature, and also getting children to write their own problems.

Check out Andre Toom's website for more of his insights on teaching math: toomandre.com.

sound reason: These objects are easy to imagine moving at constant speeds.

"There is an important similarity between children's play and mathematics: In both cases, creative imagination is essential."

—Andre Toom

The Trouble with Word Problems

How can we teach our students to reason their way through math problems? We must help them develop the ability to translate real-world situations into mathematical language.

Most young children solve story problems by the flash-of-insight method, hearing the problem and knowing by instinct how to solve it. This is fine for simple problems like "Four kittens played with a yarn ball. Two more kittens came to join the fun. Then how many kittens were playing with the yarn ball?"

When problems grow more difficult, however, that flash of insight becomes less reliable. We find our children fidgeting with their paper, staring out the window, complaining, "I don't know what to do. It's too hard."

They need a tool that will work when insight fails.

In solving a textbook word problem, students blaze a trail through the unknown. They must:

- Read the problem and understand what it's asking.
- Translate the problem into a mathematical calculation or algebraic equation.
- Do the calculation or solve the equation.
- Make sense of the answer, explaining how it relates to the original problem.

The first two steps give students the most trouble. They could calculate just fine, if they could decide which calculation to do.

But they don't know how to translate the problem from English into Mathish.

One common classroom approach emphasizes *key* or *signal* words. For instance, we can tell our children that a problem asking "How many more?" will probably require subtraction. The question asks for the difference between two quantities, and *difference* is the answer when you subtract. But this technique only works for the simplest word problems.

Unfortunately, key words can mislead a careless reader.

For example, consider this question: "What must we add to 2 to get 7 as the sum?" The words *add* and *sum* are designed to lead an unwary child into the trap of answering 2 + 7 = 9.

Or this one: "There are 21 girls in a class. There are 3 times as many girls as boys. How many boys are in the class?" Would the word *times* trick your child into multiplying 21 × 3 = 63?

I do teach a few key words to my students. My favorite is the translation "*of* = multiply" when dealing with fraction and percent problems. But I want my kids to read a math problem and to analyze what is happening, no matter what words are used to describe the situation. For this, they need a more powerful tool.

In addition to key words, watch out for all those cutesy math charts and posters you see on Pinterest.

Teacher tricks like "C.U.B.E.S." actually discourage children from thinking about what's happening in the problem.

It's the *story* that serves as a math manipulative. Only as kids reason their way through the story can they apply their common sese to solving it.

Four Common-Sense Questions to Solve Any Problem

Because all people begin their school career by solving problems intuitively, children expect to look at a math puzzle and instantly see the answer. As students progress through the years, their math problems develop layers of complexity. Solution by intuitive leap becomes impossible. Too often a frustrated child concludes, "I'm just not good at math."

But the truth is that *nobody* is good at math, if you define "good at math" to mean they can see the answer instantly. Here's a more useful definition: You're good at math if you have problem-solving tools and know how to use them.

And *that* is something everyone can learn.

If you're a math teacher, you may recognize my Four Questions.

I adapted them from George Polya's book, *How To Solve It*, which is all about how to reason your way through a problem when you don't know what to do—exactly what we want our kids to learn.

The Four Questions are also included in the *Word Problems Student Workbook*.

And they are the basis for a more thorough treatise on problem solving: "The Case of the Mysterious Story Problem," written directly to the student by noted consulting detective Sherlock Holmes.

Check my publisher's website to find out where you can pick up "The Case" along with my other printable activity guides: tabletopacademy.net/playful-math-books.

(Kickstarter backers, check your rewards. "The Case" was included in most of the pledge levels.)

When children are faced with a math problem, they need to combine the given facts in some way to reach the required answer. But rarely can they do it in a single leap. So encourage them to take one little step at a time. Even if they can't solve the problem, can they think of a way to get closer to the goal?

Teach your child to ask these four questions…

(1) What Do I Know?

Read the problem carefully. Reread it until you can describe the situation in your own words.

List the facts or information given in the problem. Notice math vocabulary words like *factor, multiple, area,* or *perimeter.* What do you remember about those topics?

Sometimes a problem tries to trick you. Watch out for mixed units: If one length is given in inches and another is given in yards, make them consistent.

Try to express the facts in math symbols or using the visual algebra of a bar model diagram.

(2) What Do I Want?

Describe the goal, what the problem is asking you to find. What will your answer look like?

Notice important words like *product, sum, next,* or *not.* Small words like "not" are especially easy to miss.

Try to express the goal in math symbols or using the visual algebra of a bar model diagram.

(3) What Can I Do?

Imagine yourself in the story situation, applying your hard-earned common sense. If this actually happened to you, what would you do?

Mix things around in your mind. Combine the given facts.

Have you worked a problem like this before? How did you solve that one? Will that method, or something like it, work here?

If you're using a bar model, think about ways you might move or cut the blocks to discover new relationships.

Try a tool from your problem-solving toolbox:

- Draw and label a diagram or sketch.
- Act the problem out, step by step.
- Make a systematic list, chart, table, or graph.
- Look for a pattern.
- Simplify the problem. Try it with smaller numbers.
- Change your focus. Restate the problem in another way.
- Look for a related problem. How is it the same? How is it different?
- Think about "before" and "after" situations.
- Work backwards. Start at the end of the problem and find a path back to the beginning.
- Guess and check. Try something to see if it works, and then make sure you know why.

If you are completely stumped, explain the problem to another person. Talking it over might help unclog your brain, opening your eyes to clues you had missed until you put them into words. Or take a break to let the problem simmer in your unconscious mind while you do other things.

(4) Does It Make Sense?

Don't neglect this last step! When you think you have found the answer, always look back at the original problem one more time.

Does your answer make sense? Did you leave anything out?

If your children use these Four Questions—and if they refuse to give up—then they *will* succeed at math.

From elementary school to graduate-level mathematics, these questions are the key to success.

And be sure not to let them skip question #4. It's the most important!

Can you think of a way to confirm that your answer is right?

Can you think of another way you might have gotten the answer? If you see an alternate approach, would that method have been easier? Make a note of any ideas you come up with. You may need them to solve your next puzzle.

Sometimes, instead of working through a whole page of math problems, take time to look intently at one problem. See how many different ways you can find to solve it. Such an exercise builds flexible thinking, showing students the depth of their own knowledge, helping them reason more creatively the next time they get stuck.

Through most of this book, I'll use bar models to draw a picture of my thoughts as I work out the solution to each sample problem.

You can still use the *Word Problems from Literature* approach to math, even if you never try bar models.

But I find the models so helpful (expecially for visual thinkers) that I love having the chance to show you how they work.

Bar Model Diagrams as Pictorial Manipulatives

One of my favorite tools for translating elementary and middle school word problems into math is a *bar model diagram.* The process of drawing and working through a bar model leads the child step by step through all four problem-solving questions.

Bar models are a pictorial form of algebra in which we represent quantities (both known and unknown) as block-like rectangles. The child imagines moving these blocks around or cutting them into smaller pieces to find a useful relationship between the known and unknown quantities. In this way, the abstract mystery of the word problem becomes a shape puzzle: How can we fit these blocks together?

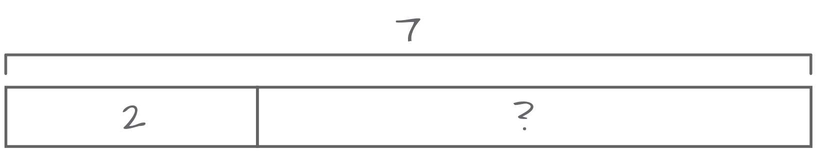
For children who have played with Legos or Cuisenaire rods, this visual approach can reveal the underlying structure of a word problem, which helps them see how it's like others they've already solved, just as detectives search for a criminal's *modus operandi* (MO). Recognizing a math problem's structure helps kids solve the case.

It's a trick well worth learning, no matter what math program you use.

All bar model diagrams (also called *Singapore math models* or *measuring tape diagrams*) descend from one basic principle: The whole is the sum of its parts. If you know the value of both parts, you can add them to get the whole. If you know the whole total and one part, you can subtract what you know to find the other part.

The most basic bar diagram: Two parts make a whole.

Recall the problem designed to stump a child using key words: "What must we add to 2 to get 7 as the sum?" We can draw a rectangular bar to represent the total amount. Then we divide it into two parts, representing the number we know and the unknown part. Now it's easy to see the answer:



Seven is the sum, the whole thing. What must be the missing part?

As the number relationships in math problems grow more complex, the bar model may be split into more than two parts. Also, the parts may relate to each other in ways that require a more elaborate diagram. Multiplication, division, or fraction problems will involve several parts that are the same size, called *units*. But even with a complicated story, the solution begins by drawing a simple bar to represent one whole thing.

For instance: "There are 21 girls in a class. There are 3 times as many girls as boys. How many boys are in the class?" To show three times as many girls as boys, we start with a bar for the

The phrase "the whole is the sum of its parts" comes originally from Euclid's classic book, the *Elements of Geometry.*

It's a statement about how numbers and shapes behave.

But it's not a universal truth. In the real world, a whole can sometimes be more or less than the sum of its parts.

For example, a cake is much more than a pile of powdery ingredients. On the other hand, 2 c. sugar + 1 c. water makes significantly less than 3 c. syrup.

In elementary and middle school math, however, "the whole is the sum of its parts" holds true.

And even in higher math, the statement doesn't break down until you start tinkering with infinity, or fractals, or other topics well beyond most people's experience.

People are always skeptical when I tell them to *not* solve the problems. But it's an almost-magical teaching tip. I've used it from elementary arithmetic to high school geometry, and it always helps students focus their attention on the process of figuring things out.

The answer is never the important thing in real math. The important thing is how chldren think their way through a problem.

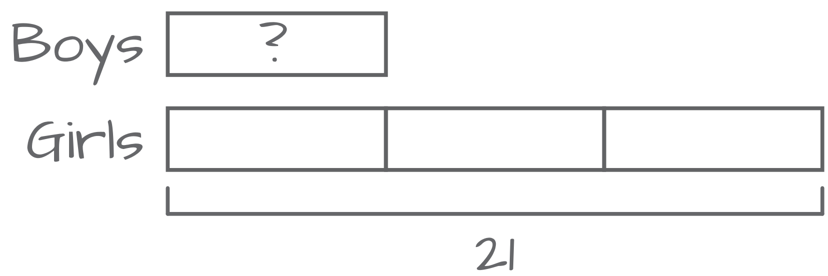
Doing the final calculation can feel like busywork after the real job of thinking is done.

Many people believe that getting right answers is the goal of school math, but it's not. If right answers were the goal, we would simply buy every child a calculator.

Right answers are merely the side-effect of our real goal: sound reasoning.

When we focus on recognizing and making sense of number relationships, we get the answers as a bonus.

But when we focus on the answers themselves, we find ourselves tempted to teach children tricks and shortcuts instead of real math. In the long run, we end up with neither understanding nor right answers, but instead we get a majority of adults in our society who say, "I'm not a math person."



The bar model helps children see that they need to divide, not multiply, to find the number of boys.

number of boys. That's one unit, and then we need three units to show the number of girls.

Teaching Tips

I think the best way to learn to solve story problems is by *not solving the problems.* Look at the story and show how to think about it, without being distracted by calculations. Work on learning to apply common sense.

When I teach my students to draw bar diagrams, I do it apart from their daily homework. My kids may work their daily homework by whatever method they choose—including doing it in their heads and just writing an answer—as long as they can explain the logic of their solution. But in our story problem journal, they have to draw the bars.

As compensation for the extra pencil work of drawing, we don't calculate the answer. Once they show me how to set up the bars and tell me the steps for solving it, they are done with that problem. They think they are getting off easy, because they skipped the actual multiplication or subtraction or whatever. But I want them to focus on reasoning about the problem situation, learning how the bar diagram tool works before they get to the tough problems where they need it.

We begin by drawing long rectangles—imagine Lego blocks or Cuisenaire rods. I say, "Let's imagine the books/fish/snowballs set out in a row." We write labels beside each bar, to identify its meaning in the story. We build the diagram as we discuss the problem, adding numbers inside a block, using brackets to group the bars together or to indicate a specific section of a bar.

If your student has trouble figuring out where the numbers go in the diagram, you might ask, "Which is the big amount, the whole thing? What are the parts? How do the parts relate to each other?"

To solve a bar model diagram, your student must learn two simple but important rules:

The Whole Is the Sum of Its Parts

Bar diagrams rely on the inverse relationship between addition and subtraction: The whole is the sum of its parts. No matter how complicated the word problem, the solution begins by identifying a whole thing made up of parts.

Simplify to a Single Unknown

You cannot solve for two unknown numbers at once. You must use the facts given in your problem and manipulate the blocks in your drawing until you can connect one unknown unit (or a group of same-size units) to a number. Once you find that single unknown unit, the other quantities will fall into place.

Practice bar models with your child until drawing a diagram becomes almost automatic. Start with simple story problems that are easy enough to solve with a flash of insight. Discuss how you can show the relationships between quantities, translating the English of the stories into a bar model picture. Then work up to more challenging problems.

The following chapters provide a range of story puzzles from early-elementary problems to middle-school stumpers. Let's get started …

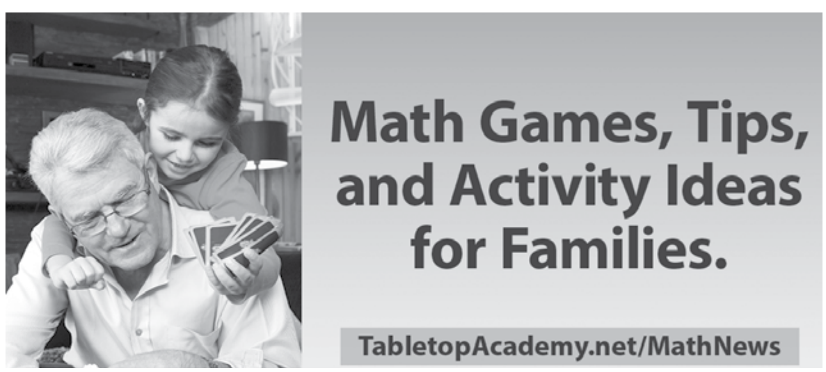
About the Author

For more than three decades, Denise Gaskins has helped countless families conquer their fear of math through play. As a math coach and veteran homeschooling mother of five, Denise has taught or tutored at every level from preschool to precalculus. She shares math inspirations, tips, activities, and games on her blog at DeniseGaskins.com.

Denise encourages parents and teachers to look at math with fresh eyes. "We want to explore the adventure of learning math as mental play, the essence of creative problem solving. Mathematics is not just rules and rote memory. Math is a game, playing with ideas."

Get More Playful Math

Join Denise's free newsletter list to receive an eight-week "Playful Math for Families" email course with math tips, activities, games, and book excerpts. Also, about once a month, she'll send out additional ideas for playing math with your kids. And you'll be one of the first to hear about new math books, revisions, and sales or other promotions.



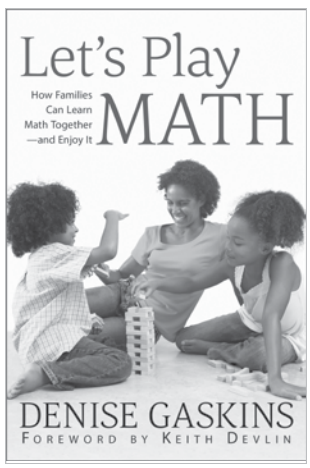
Books by Denise Gaskins

tabletopacademy.net/playful-math-books

"Denise has gathered up a treasure trove of living math resources for busy parents. If you've ever struggled to see how to make math come alive beyond your math curriculum (or if you've ever considered teaching math without a curriculum), you'll want to check out this book."

— *KATE SNOW, AUTHOR OF MULTIPLICATION FACTS THAT STICK*

Let's Play Math: How Families Can Learn Math Together — and Enjoy It

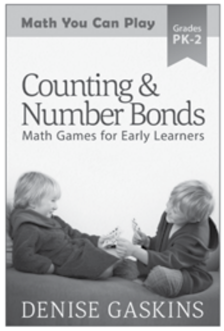


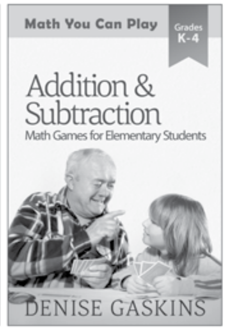
Transform your child's experience of math!

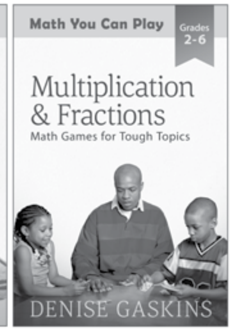
Even if you struggled with mathematics in school, you can help your children enjoy learning and prepare them for academic success.

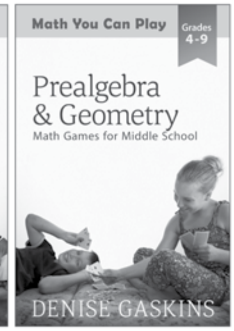
Author Denise Gaskins makes it easy with this mixture of math games, low-prep project ideas, and inspiring coffee-chat advice from a veteran homeschooling mother of five. Drawing on more than thirty years of teaching experience, Gaskins provides helpful tips for parents with kids from preschool to high school, whether your children learn at home or attend a traditional classroom.

Don't let your children suffer from the epidemic of math anxiety. Pick up a copy of *Let's Play Math,* and start enjoying math today.









The *Math You Can Play* Series

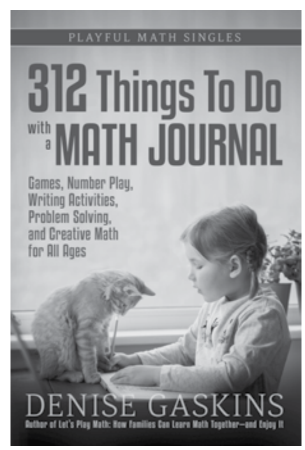
You'll love these math games because they give your child a strong foundation for mathematical success.

By playing these games, you strengthen your child's intuitive understanding of numbers and build problem-solving strategies. Mastering a math game can be hard work. But kids do it willingly because it's fun.

Math games prevent math anxiety. Games pump up your child's mental muscles, reduce the fear of failure, and generate a positive attitude toward mathematics.

So what are you waiting for? Clear off a table, grab a deck of cards, and let's play some math.

The *Playful Math Singles* Series



The *Playful Math Singles* from Tabletop Academy Press are short, topical books featuring clear explanations and ready-to-play activities.

312 Things To Do with a Math Journal includes number play prompts, games, math art, story problems, mini-essays, geometry investigations, brainteasers, number patterns, research projects for all ages.

70+ Things To Do with a Hundred Chart shows you how to take your child on a mathematical adventure through playful, practical activities. Who knew math could be so much fun?

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