

*THE
HOMESCHOOLING
PARENT
TEACHES MATH!*

*Bringing Math to the Math-Averse
(Parents and Kids Both!)*

Kerridwen Mangala McNamara, M.S.



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The Homeschooling Parent: Brining Math to the Math-Averse (Parents and Kids Both!)

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For my dad, Dr. Suresh K, Bhate, Ph.D.,
who made me learn the Math in the first place.

For my husband, who had faith in my ability to
homeschool our kids and teach them math
even when I didn't always have it for myself...
and who engaged with me in the greatest marketing
scheme since "Move to Greenland - the climate is great!"

For my kids, who made me have to fake confidence and
enthusiasm for math for long enough that it
became REAL.

And for my oldest daughter, A. Meenakshi McNamara,
who gave me the opportunity to realize
Math could be enjoyable.

CONTENTS

INTRODUCTION

From a Mom's Perspective...1

CHAPTER ONE:

How NOT to teach math7

- You don't have to follow current or former school approaches
- You don't have to stick to the first curriculum (that you try)
- You don't have to use a curriculum (with a caveat)

CHAPTER TWO:

Comparing Curricula

(matching you and your kids' needs to what's available)21

- Philosophical choices
- Learning styles: visual/ hands on/ desk work
- Online curricula (do they work?)
- Different amounts of parent-child interaction/input
- Cost

CHAPTER THREE:

Math Circles

(going beyond curriculum, making it cool)49

- What is a math circle?
- Other math communities for kids and families

CHAPTER FOUR:

Getting yourself on-board

(Math for Moms and Dads [and other family members])65

- Playing solitary math games
- Seeing math in regular life

CHAPTER FIVE:

Transitions and Sideways Thinking

(Defeating the Fear at its Source)81

- Division, fractions and negative numbers
 - Don't lie: the truth about negative numbers and dividing by zero
- Algebra (hint, you actually do it every day)
- Geometry (your secret weapon with math-avoiders)
- Trigonometry (only one shape, how bad can it be?)
- Functions (you use this one every day, too)
- Calculus – not just for whiz-kids...
- The Keys to the Kingdom

CHAPTER SIX:

Putting it all together

(Creating a Math-Positive Environment in your family)111

- Real life math with the kids
- Math games with the family

CONCLUSION:

Enjoy it! Finding the beauty in math131

MATH RESOURCES LIST

(compiled from the chapters of the book)137

ALSO BY KERRIDWEN MANGALA McNAMARA ...156

AUTHOR'S NOTE157

ABOUT THE AUTHOR162

Introduction

From a Mom's Perspective...

“**M**ATH IS SOOOOO BOOORING...”
“Math is too hard.”

“I hate math!”

Every parent has heard these things, including me.

The real story behind those complaints is that math is *scary* to a great many people. Some of those people are kids.

But a great many of those people are grown-ups: parents and teachers; and we transmit our own fears and negative math experiences to our kids, even when we don't mean to.

Okay, so you knew all that before you picked up this book. Why should you keep reading?

This book is about changing our relationships with math. The relationships our *kids* have with math *and* the relationship we have with math ourselves. Our ultimate goal is not to transform ourselves into math-lovers, but to go somewhat beyond math-tolerators to become math-*appreciators*.

KERRIDWEN MANGALA MCNAMARA

We do this by creating a *math-positive environment* in our families and in our lives.

Why bother?

Well, some of the benefits might be immediately obvious – less fighting and better grades (or progress) for your kids. Other benefits – to yourself and your family and even your community – might seem more nebulous or pie-in-the-sky, but it’s possible that you’ll appreciate them even more in the long run.

How do I know?

I was afraid of math for a long time, *even though I got good grades in it.*

I thought I sucked at math because my good grades “weren’t all my own work” since I had other people helping me or tutoring me along the way. I went farther with math than most people do – even most people in my chosen STEM-field (I’m a biologist) – and I *still* thought I sucked at math.

It wasn’t until I was 40 years old and my oldest daughter was thirteen and beginning to really love math (for reasons I’m still unclear about). It didn’t last for much longer – she sped ahead at lightspeed – but I suddenly realized I was *good* at math because I could answer the more advanced questions she was working on, even though it took some effort.

It took me another *three* years – and creating a “Math Circle” to try to build a supportive community for her – to realize I *like* math.

And... when I say I “like” math I don’t mean that I go around looking for math puzzles to solve (I actually kind of hate those). It doesn’t mean that I can solve problems that I solved way back in college anymore (doing calculus and differential equations is NOT like riding a bike, I’m disappointed to tell you). And it doesn’t mean I think everyone should go “Yippee!” when someone has a math question.

Heck no.

For me “liking math” means I’m not *scared* of it anymore.

THE HOMESCHOOLING PARENT TEACHES *MATH!*

It means that I don't cringe over setting up a spreadsheet to track my words written or my household expenses (though I may be cringing for other reasons). It means I don't avoid helping my husband with the taxes (though 2021 taxes were some weird labyrinth, even for a normal 1040). It means that I feel a certain confidence that I *can* solve both my kids' academic questions and help them understand... and that I can solve real-world problems like how much tile to buy for the bathroom floor or how much wood we need for that A-frame goat-shelter we built last year.

It means that when I read an article that mentions statistics or the federal budget or estimates of how many stars are in the universe – or whatever – I can decide whether I'm going to stop and think through their argument more closely or just keep reading. I usually just keep reading, but I have the confidence that I can go back and untangle what they meant or even decide I think the author was wrong if I end up caring to take the time.

It means that I can look around the world and see a different kind of beauty. (And for me that means a different and deeper kind of connection to the Universe... this book isn't about that, though, so we'll leave those musings for another day).

And it means that I was able to *support* my daughter to retain *her* enthusiasm for mathematics. And it worked! She's about to start applying to graduate schools in mathematics! (Before you freak out, none of the other five kids seem to think of math as more than somewhat interesting and useful and tolerable... *mostly* tolerable.)

But lastly... it means that when my daughter tells me about some exciting thing she's learned or is working on in math... I don't always *understand*, but I can ask questions and get something out of it enough that she *keeps coming back to talk to me*.

And as parents, that's a big part of our goal – with math or otherwise. We want our battles over math – or writing or reading or history or whatever – to still, somehow, end with our kids both

KERRIDWEN MANGALA MCNAMARA

knowledgeable about the subject and capable of using it at whatever level they are going to need it in their grown-up lives... But also, that they don't see us as those screeching monsters who forced them to do this thing they hated (even if they now appreciate knowing it). We want them to call us up randomly out of the blue to chat and tell us about their lives and ask us questions and listen to our lives. We want them to appreciate us, and for that appreciation not to be marred by traumatic memories of battles over math.

In this book, I'll share some of my personal math journey, and that of some of my kids. Mostly I'll refer to them by the ages they were at the time or by "code-names" to avoid personal embarrassments. (I'll likewise keep the stories from friends and other homeschoolers that I have been gifted to observe largely anonymized.) It was a *rocky* journey, even for people who actually came from relatively math-positive (but rather different) families as my husband and I both did.

But in the end... sharp rocks and tears along the way or not, if the cuts and bruises got kisses and hugs and you can look back on the vista behind and say "wow!" and look at each other and say "that was cool, let's do it again!" ...it was worth it to us.

Hopefully this book can show you a somewhat smoother path to the peak!

(And if what you need right now is just a list of resources... you can skip straight to the back! So long as you keep in mind that a resource is only as helpful as you make it...)

THE HOMESCHOOLING PARENT TEACHES *MATH!*

Chapter One:

How NOT to teach math

- *You don't have to follow current or former school approaches*
- *You don't have to stick to the first curriculum (that you try)*
- *You don't have to use a curriculum (with a caveat)*

MY PARENTS LOVED MATH. THEY were those annoying kids in school who thrived on testing and pop-quizzes. They adored “drill and kill” approaches because they excelled at them. And they expected me to do the same. When they pulled me out of school for health reasons and bullying (described in some detail in my first book *The Homeschooling Parent*) at the beginning of second grade, they were deeply invested in me continuing to take the standardized tests at the end of the year – and they turned what the school seemed to use as a simple evaluation into *high-stakes testing* by telling me that if I didn't

KERRIDWEN MANGALA MCNAMARA

do “well enough” we were giving up the “homeschooling experiment” and sending me back to school. For me, school meant bullying (the emotional kind that wasn’t really considered bullying in the very early ‘80s, so my parents weren’t entirely aware) and for them, “well enough” meant better than the 95th percentile.

Parental expectations will do a lot, and I did my best.

But I hated it.

Let me be clear: I don’t harbor any resentment towards my parents for any of this. They did an amazing job in my entirely-biased opinion, including making the very hard decision to homeschool when, literally, *nobody* outside of certain very Right-wing religious groups or very, *very* Left-wing communities was doing it. There were no curricula, no support groups, no playgroups, no co-ops, and no *information* besides a strict school-at-home approach or unschooling.

My parents were brave and, without exaggeration, may have saved my life. They certainly saved my sanity.

And they taught me in the way that had worked for them, which is an entirely legit way to approach the question.

My mind works enough the way theirs does that I could learn like this... but school’s drill-and-kill-and-God-help-you-if-you-get-it-wrong approach had just about destroyed my interest in math. Now I saw it as a necessary, if somewhat horrible, thing I had to do to get to keep homeschooling, so I approached math with a certain grim intensity when need be and avoided it like the plague the rest of the time.

What my parents didn’t know was this:

You don’t have to follow current or former school approaches

This is both the most utterly freeing and most utterly terrifying thing to hear.

THE HOMESCHOOLING PARENT TEACHES *MATH!*

You don't have to teach or learn the way you learned it. Or the way your friend who homeschools does it. Or the way your homeschool co-op families do it.

Or the way your local school district (or state, or even *country*) does it.

There's a caveat to this, of course.

Depending on where you live, there may be local, state, or federal regulations on what (and in a few places, even *how*) you homeschool or teach specific subjects. If there are such regulations in your area, Math is probably the first topic regulated, for all that very, very few schools do a particularly good job with it. Your first job as the homeschooling parent is always to look up what regulations you need to meet (and which ones are "recommended" but not required); I advise you to contact your nearest Unschooling group or Waldorf School if you disagree with those regulations and find out how they get around those regulations... at least in the United States, my understanding is that it is legal to Unschool in all the states, so there has to be a way.

Okay, now that the "I'm not a lawyer, please do your research" caveat has been discussed... back to the topic.

You probably learned math in school the way most of us did in school. Your teacher presented a particular type of problem and then made you do hundreds and hundreds of variations on that problem. By the time you were done with all that, and she was ready to move on to the next one, you were *really, really good* at solving that one type of problem... but most of us probably couldn't take a curve-ball where the problem was presented a little differently, or where we had to use that kind of problem to solve something in the real world.

And if you didn't figure out how to solve that *one* type of problem... the answer was usually to load you with *more* of that kind of problem in some sort of hope of hammering it into your head until it stayed, even if you didn't understand (or, by this point, *care*) about solving it at all.

KERRIDWEN MANGALA MCNAMARA

And then, once you'd done a few rounds of this sort of thing, there would be the Review and the Exam and you had to pry all the old types of problems back out (after they'd been hammered down beneath new layers of other ones) and hopefully be able to solve them well enough to get a good grade.

This method is often called “Drill-and-Kill” – and it *does* have a few benefits.

One benefit is that most of us know how to operate this way. This is how *we* were taught, so it's the natural approach for many of us to start with. It feels... well, maybe not *comfortable*, but familiar. And, honestly, familiarity – especially when you are first embarking into the world of homeschooling – is not to be underestimated.

A second benefit is that it's easy to find resources for this approach. Kumon (both the “after-school” institutions and the workbooks you'll find at Barnes & Noble) and the popular Saxon homeschooling curriculum are a couple of examples of this. Math-aids.com is a website that allows you to generate customized worksheets with lots of problems – so you could use it for this approach as well (but also in other ways, more on that later).

But the *biggest* benefit of “Drill-and-Kill” in my experience to-date is that it makes you get incredibly *fast* at very specific types of problems. You get *fast* because you are really memorizing those specific problems *and their answers* and then when you see them again – possibly even in a different context, which is the real goal – you can spit out the answer, move on, and accomplish something else faster than if you had to sort it all out.

And, yes, the *faster* thing, really is a Thing. And not just in elementary (or middle or high) school.

Why?

Because while math isn't quite as sequential as we're usually taught (I'm getting to that...) each bit of it *does* build on the parts you already know. If you have to stop and count on your fingers every time you hit

THE HOMESCHOOLING PARENT TEACHES *MATH!*

an addition problem under 10 – or do the “trick” of adding/subtracting instead of multiplying/dividing – it’s going to slow you down when you get to Algebra. And then *that* is going to slow you down in Physics or Chemistry or Personal Finance or even Home Economics (baking, for example, and doubling or halving recipes). Or Carpentry, Costume Design, or Garden-planning.

You know, at things you (*or your kid*) might actually care about.

And being slow at something you care about is *frustrating*.

And *frustration* is what we are trying to take out of math, not intentionally put into it.

My oldest daughter, Meenakshi, is a mathematician and, unarguably, *better* at all kinds of math than her dad (who is a professor of electrical engineering and uses pretty advanced math daily). However, she is *slower* than he is at basic arithmetic... and, depending on how we set it up, she’s even slower than I am.

Now this isn’t necessarily a fair comparison. The TV show “Are You Smarter Than a Fifth Grader” pitted actual fifth graders against adults who hadn’t looked at the material the kids had just finished learning in twenty years or more. Meenakshi doesn’t bother with arithmetic anymore – she’s doing some exotic thing called “Operator Algebras”. So, she might be a bit out of practice.

Her dad and I are still faster than *our* fifth grader – and our seventh grader, for that matter – on basic arithmetic. And our fifth and seventh graders are really *good* at math.

The difference is that we didn’t do “Drill-and-Kill” with our kids, although we were subjected to it ourselves as children.

Now, the *downsides* of “Drill-and-Kill” are beyond obvious. It’s boring, it’s disconnected from the real world, and – unless you are the type of person who thrives on repetition or have a teacher who gives you a great amount of useful feedback on your mistakes – pretty discouraging.

KERRIDWEN MANGALA MCNAMARA

Great teachers – and there are a lot of them out there – have spent the last twenty (or thirty... or forty) years trying to find ways to make Math more connected and connectable. Among the various tools they have explored are different Learning Styles, Problem-Based (or Project-Based) Learning, Gameschooling (not what school teachers call it, but it is what it is), and Consumer (or Real World) Math. Everyone seems to realize that there is a problem with how math is taught and learned – nobody is happy with the aggregate statistics for their national education systems (except maybe Singapore, more on them later).

This is where all this New Math and (in the USA) Common Core comes from. The Educational Establishment is trying to Make Math More Accessible and Absorbable.

And it's a monumental task.

Well.

It is if you are trying to deal with (in the USA) 50-60 *million* kids.

And if you are trying to use the same curriculum for every single one of them. (Or, perhaps, modify it slightly for the kids who fall too far off the center of the Bell curve on either end.)

But it's an entirely solvable problem for homeschoolers.

Why?

Because you only have one or two or a handful of kids. (I have six, and I know a few people with more than me.)

Because you don't have to buy (or find free online) the *one* state- or federally-approved curriculum... and buy three hundred copies of it from the publisher... and then try to push and shove it into a shape that works better for the twenty percent or so of kids at either end of your classroom learning curve... and just wince helplessly at the twenty to forty percent of kids for whom it *sort of* works, but not terribly well. And then work like the dickens to get it to work for everyone, because if all your kids aren't up to an arbitrarily decided 'grade-level' by the

THE HOMESCHOOLING PARENT TEACHES *MATH!*

end of the school year, it could mean your job, no matter where each of them started, and no matter how much they improved from that starting point.

Which brings me to the next point:

You don't have to stick to the first curriculum (that you try)

YOU, the HOMESCHOOLING PARENT can purchase your curriculum one year, one semester, or even *one workbook* at a time and see if it's a good fit for your *one* child who's at that level. (Or your two or whatever if you have twins, or two kids who happen to be on the same level.)

YOU, the HOMESCHOOLING PARENT can *ditch your little piece of curriculum* if it is clearly not working for both you *and* your kid... after a year, a semester, even a month. (I suggest giving anything a month.) There are lots of places to sell gently-used homeschool curriculum – from Craigslist and eBay to specialty websites and, if you're lucky, even local brick-and-mortar stores (usually run by some homeschooling parent – or former homeschooling parent – which rocks, because he or she can tell you about other curricula they have seen that might meet your needs better).

Do you take a loss on re-selling? Of course, but it's not as big a hit as you might expect if your stuff is in good shape (even several years later, when you're done with it, instead of just jumping ships), and if you buy the *smallest* bit of the curriculum that the publisher will sell you that you think you'll use (say a single workbook and/or textbook... and *maybe* the solutions manual or teacher's guide) then it's a smaller loss to try something out. The curriculum that you loathed or your kid burst into tears over (or vice versa... or both) might be a perfect fit for someone else. And vice versa, so check those used sources yourself!

YOU, the HOMESCHOOLING PARENT can use a *different* curriculum for each of the kids in your care. Or you can use that one copy you bought for Child #1 for the next two and switch for Child #4. Or you can loan or give it away to a friend. (Or if it's one that you hated, to someone you dislike... I suppose..)

YOU, the HOMESCHOOLING PARENT can decide *how* and *how much* to use the curriculum you bought. If you decided to go rock-bottom cheap and pick up the Kumon (or Star Wars) workbooks at Barnes & Noble (yes, there really are Star Wars-themed workbooks for math and English... they're not bad, but only younger grades), but you've gotten excited about Gameschooling... You can decide to take you're kid out to the trampoline and have them jump the answers to the Kumon workbook (I wouldn't suggest this with 3-digit by 2-digit multiplication... unless your kid is *really* energetic and you have a *lot* of time) or get out your Star Wars Legos and line them up to solve the math problems before (re)building the Death Star or Millenium Falcon.

You can also, as I ended up doing, *skip all the Exercises* and just have your kid do the Reviews so long as they're meeting your standard to move on. (Often that's about 80% correct. Some families – or some kids – like to go back and fix any errors. I have two right now who work that way. Others are satisfied if the errors look like careless mistakes, but all the concepts being 'reviewed' are getting a similar level of accuracy. I've gone back and forth on this.)

YOU HAVE THE CONTROL.

And if that means using a video-based approach for Child #1 (like Khan Academy), a game-based approach for Child #2 (like ProdigyGameOnline), and woodworking with Child #3 – but you have all of them do the Reviews in a Singapore workbook (or do the Math Kangaroo competition) just to see where they would compare with other kids of their age or grade... **THAT IS OKAY.**

THE HOMESCHOOLING PARENT TEACHES *MATH!*

Why am I harping on this point?

Because the **NUMBER ONE** stress that I see homeschoolers – especially, but not only brand-new ones – struggling with is this idea that the curriculum is THERE. You BOUGHT IT. Now you must USE IT. And you have to USE IT THE WAY THEY TELL YOU.

No.

You don't.

Except for certain very special circumstances, there are no Curriculum Police making sure your kid does every last, painful page of that curriculum that makes you both feel more than slightly nauseous. Or makes one of you throw tantrums to avoid it (we won't talk about whether that would be you or the kid). Those special circumstances occur when you have either *chosen* to use a curriculum that comes with oversight (online or in-person) or if you live in one of the areas where a particular curriculum is government-mandated (and they check up on it) ...or if you have custody issues going on and need to satisfy a non- or partially-custodial parent or guardian that you are meeting some mutually agreed-upon standard for your kids' education.

All of these things have their place: some of us thrive on the “accountability” of these bought curricula, some of us trust the government-chosen curriculum, and in the case of a custody situation, sometimes you're compromising on curriculum but getting to homeschool the kids and that's a win right there.

But if you are *not* tied into one of these special situations (and remember, if it's a curriculum you bought, you can *ditch* it!) then you have the flexibility to be creative to meet your kids' needs.

How creative?

Well, in the extreme...

You don't have to use a curriculum (with a caveat)

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In the *absolute* extreme, this is called Unschooling (or even *Radical* Unschooling). And, to be quite honest, most of us aren't there. Unschooling is a philosophical choice based on the idea that kids will learn what they need when *they* need to learn it. And that's all well and good, and it *can* work... except that for Unschooling to work *well* requires a tremendous amount more effort from the homeschooling parent.

Why? Because it's not about letting your kids just run around like wild animals all day. It's about providing a very Learning Positive Environment, such that they are constantly seeing things that excite and interest them and that they want to explore further. It's about being very, *very* aware of how much you can nudge and suggest before *their* interest becomes *your* interest and you are dragging them to go see more dinosaurs or whatever and they now hate dinosaurs. And it's about being incredibly *patient* and *trusting in* (*whatever you put your trust in*) that this will all work out in the end and you won't end up with a 20-year-old (or 30-year-old) eating you out of house and home and lying around watching videos all day long. (Though since that particular outcome seems to come out of public/private school education as well...??)

An "unschool-y" approach can be very workable in the younger years, however.

Quite honestly, there really isn't anything sacred about learning addition in kindergarten, subtraction in first grade, multiplication in second, and division in third. The Waldorf School approach introduces all four of those operations *simultaneously* in first grade and continues growing them each year, just as one example of doing it differently. And the ancient Greeks didn't have modern arithmetic in the same way – their focus was entirely on Geometry. And one of the reasons the USA tried (only semi-successfully) to introduce Common Core was because different school districts around the country taught (or teach) things in different sequences, so a kid who ended up moving a couple times might cover fractions three times and miss percentages

THE HOMESCHOOLING PARENT TEACHES *MATH!*

entirely (this is actually one of the reasons so many military families homeschool, since most of them move every couple of years).

If you choose to go “curriculum free”...you may still find yourself using the odd piece of a bought (or printed-off-the-internet, or videos, or...) curriculum.

Why?

Because there are some really awesome resources out there, many of which are *free*.

Because it is a *pain-and-a-half* to create *all* your own curriculum from scratch (so sayeth the voice of experience).

And finally, because, you have other things to do with your life than plan out solvable math problems and concoct elaborate and sneaky ways to get your kids to do math.

Seriously, people. Someone else has already done that work. Even if you consider yourself (or would like to) an Unschooling family... it is *not* “cheating” to use someone else’s prepared materials.

I actually prefer the term **CHILD-INSPIRED** to the more commonly used “unschooling”.

The kids *inspire* our homeschooling approach by letting me and their dad (and older siblings) know what they find exciting and interesting. They may or may not have some long-term “career” goal or “this is how I want to change the world” goal. But they almost *never* have any idea how to get to where they want to go, even if they know where that is.

My job, as the parent, is to do the research and talk to people and *find the resources*. This means helping them figure out where they are going, and helping them map out potential futures where they have control over their own lives (and pay for their own food). It also means figuring out what are some of the possible paths to getting to those endpoints – and helping the kids see that there are certain things they need to do to get to their desired outcome.

KERRIDWEN MANGALA MCNAMARA

We never see *all* the possible paths, of course, and we have to be open to the idea that the kid may change their mind in mid-stream. My oldest daughter was gung-ho about dinosaurs from age 3 to age 12 – at which point she ran out of kids’ books and there was a gap where the next level of books was about the paleontologists’ life stories (which she couldn’t care less about at that time) and then college-level texts on dinosaur anatomy and behavior and so on. She gave up on dinosaurs (despite the *vast* collection of miniatures which still fills out house and has been largely adopted by younger siblings), spent a couple years playing around with other ideas, and ended up becoming enchanted with Math and Physics. (Trust me, this was a *huge* surprise.) In this whole process I had to get over *my* attachment to her interest in paleontology. (It also threw her next two siblings for a loop. They had spent six or eight years planning how their interests – insects and vehicles – could work with hers and they would all go on digs together.)

What we *do* see are the things the kids can’t... or won’t.

Such as, that they need math for whatever future they are going to be living. Life is a great deal *cheaper* if you don’t have to hire an accountant to do your taxes, you know how to budget, and you can halve or double a recipe, just to name a few things. Life is a great deal more *fun* if you can plan a vacation (logistics is a branch of math... and so is finance so you can afford to go), or outwit that snarky computer-game because you know the likelihood (the *probability*) of a mob spawning near your castle.

And, of course, life can be a great deal more *interesting* if you have enough tools so that you aren’t always stuck doing someone else’s bidding and you can take opportunities that are more exciting because you have the skills to do it. Math is only one of the skills you need... but as our world gets techier and techier... it’s not really a skill we can afford to ignore.

Or afford to hate. Because what we *hate* we avoid or forget or procrastinate or get scared or angry at. And none of those things get us anywhere useful, fun, or interesting.

THE HOMESCHOOLING PARENT TEACHES *MATH!*

So... bottom-line?

Let your homeschooling be Child-Inspired. Follow their interests, but guide their path using whatever tools work for your family – strict curriculum, loose curriculum, partial curriculum, *maybe* even no curriculum (but be careful to make sure “no curriculum” doesn’t mean “no learning” ...more on that coming up, too!)

But don’t forget:

- **You don’t have to follow current or former school approaches**
- **You don’t have to stick to the first curriculum (that you try)**
- **You don’t have to use a curriculum (with a caveat)**



Also by Kerridwen Mangala McNamara

YOUNG ADULT Fantasy:

- ***Thony and the Much-Anticipated Adventure***
Book One of The Prankster Prince
- ***Thony Goes Astray! (in the Deep, Dark, and Dangerous Fairy Wood)***
Book Two of the Prankster Prince
- ***A Not-So-Sacrificial Maiden***
Book One of the Knightess of the Realm
- ***Out of the Woods... Hopefully***
A Knightess of the Realm Prequel

More YA coming soon...

- ***So You Want to Be a Hero***
Book Three of the Prankster Prince (expected Spring 2024)

FANTASY:

- ***The Rebel Duchess***
Book One of the Chronicles of Ilseador
- ***A Not-So-Simple Mission***
Book Two of the Knightess of the Realm

More Fantasy coming soon...

- ***The King's Champion***
Book Two of the Chronicles of Ilseador (expected November 2023)
- ***A Not-So-Unexpected Problem***
Book Three of the Knightess of the Realm (expected December '23)

NON-FICTION:

- ***The Homeschooling Parent***
Self-care and Feeding of the Person Who Makes It All Happen



About the Author

Mangala spent most of her life as a Math-Appreciator, but definitely NOT a Math-Enthusiast. To be honest, her tolerance for Math has its ups and downs these days, and that nasty old Fear Monster bites her in the butt whenever she tries to help her High School Senior with Calculus. (Higher math is not like riding a bike...)

One of Mangala's major goals is for her kids not to share that Math Fear, however. Nor her fear of dogs and high places. All three topics are a work in progress with greater and lesser successes and failures, and aside from occasional nightmares about suddenly discovering she was registered for a college course she didn't know about right before Finals Week... it's going well enough that Child #3 (Calculus-kid aka Car-Guy aka "I hate math" Guy) was recently heard to be advocating for Math now being "fun" to a younger child and telling him to stick with it till the other kid gets there. (Note that Child #3 never said this to Mangala directly... it was passed to her through another sibling.)

You never know...