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BAD at MATH?

DISMANTLING HARMFUL
BELIEFS THAT HINDER EQUITABLE
MATHEMATICS EDUCATION

ONLINE
STUDY GUIDE
AVAILABLE

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BAD AT MATH? **DISMANTLING HARMFUL BELIEFS** **THAT HINDER EQUITABLE** **MATHEMATICS EDUCATION**

BOOK STUDY GUIDE

Bad at Math? Dismantling Harmful Beliefs That Hinder Equitable Mathematics Education by Lidia Gonzalez.
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Note to Facilitators

Welcome to the book study guide for *Bad at Math? Dismantling Harmful Beliefs That Hinder Equitable Mathematics Education*. Every book study group or professional learning community is different and unique. If you are formally facilitating a book study group, this is meant to serve you as a guide, but you should feel free to make it your own and tailor it to the group you are facilitating. Here are some helpful tips and reminders:

Goals

Book studies are opportunities for educators to explore a professional book with peers, discuss and reflect on key takeaways, and apply that learning to their professional practice. Any book study can be worthwhile as long as you and your other participants set out clear goals and success criteria, and as long as all participants are dedicated to achieving these goals. If one of your goals is to implement the strategies in the book and evaluate them for success, be sure to define as a group what you want that success to look like (i.e., did the implementation achieve the desired outcome?).

Length and timing

This depends on the length of the book, how deep you want to go into each topic, and the availability of your participants. The following guide is not meant to be prescriptive, and you may not cover all of it, but you can adapt it to the needs of your group.

This guide offers suggestions for breaking the reading up across multiple days. If participants don't have the time to read independently before coming to the meetings, you can break up the reading into groups instead and engage in a jigsaw activity. A jigsaw is a cooperative learning strategy that enables each participant of a "home" group to specialize in one aspect of a topic or one section of reading, which they engage in with an "expert" group. They then return to their home group and share what they've learned. [Here](#) are instructions for facilitating a jigsaw. If your group engages in this format, be sure to determine whether participants have a shared understanding of the content before moving to the "Into the Classroom" sections.

Format

Many groups prefer to meet face-to-face, but it's important to consider all participants' availability and accessibility. Book studies can be equally successful online via video conference, in an online forum, or on social media.

This book study guide offers three types of interaction:

- "During Reading" questions and reflections
- "As a Group" discussion questions
- "Into the Classroom" activities

You can do or assign those that make sense to you and that fit within your time budget. If you are engaging in a jigsaw format, you may choose to have participants focus on the "During Reading" questions together. The "Into the Classroom" sections ask participants to try something in the classroom. Be sure to spend time agreeing on what criteria will determine

whether use of a particular intervention or strategy had the impact that was expected. Also leave some time at the beginning of the next meeting, or set a separate interim time, to debrief and analyze the results of the inquiry (i.e., prompt participants to describe what happened, form hypotheses, and determine next steps).

Setting norms

In order to establish a safe, trusting, respectful, and committed environment for discussing a book in a professional setting, it's critical to work with your group to co-create and agree to certain norms. Norms provide a clear pathway, helping to ensure all voices are heard and respected and no voice dominates the discussion. They ensure all members of the group can engage in a productive and meaningful experience from which they can learn and grow. Here are some guidelines and processes for setting norms:

- Brock, L. (2020, October 7). Using a book club to navigate challenging topics. *Edutopia*. <https://www.edutopia.org/article/using-book-club-navigate-challenging-topics>
- Learning Forward. (2013). *Tool: Creating norms*. <https://learningforward.org/lf-newsletter/summer-2013-vol-8-no-4-4/tool-creating-norms/>

Be sure to leave ample time during the first session, or have a separate launch session, to focus on co-creating norms.

Facilitate like a pro

Some participants will share their thoughts and opinions readily, while others may feel more hesitant and let their more outgoing colleagues guide the discussion. It's important to engage your quieter participants—without putting them on the spot—and keep the conversation moving smoothly without letting any one person dominate the discussion. Try allowing your participants to discuss with a partner or a small group, or let everyone have a moment to share.

Support

Lack of support—or even any appearance of it—can quickly derail any forward progress. Make it clear from the start that your participants will be supported by their administration as they try out their new learning in the classroom. Plus make it a point to follow up regularly to see how they've applied their learning and share what participants are doing successfully.

Note to Participants

Welcome to the book study guide for *Bad at Math? Dismantling Harmful Beliefs That Hinder Equitable Mathematics Education*. The book aims to explore commonly held beliefs about mathematics and mathematics education that drive the ways we approach mathematics education, narrow the ways we engage with mathematics, and impact efforts at reform. These beliefs include the following:

1. Mathematics is all about numbers and equations.
2. Mathematics is about getting to the one correct—the *only* correct—answer.
3. Someone who does mathematics is smart, and part of what it means to be smart is to be able to do computations quickly in one's head without the need for aids or research.
4. There exist a small number of *math people* for whom mathematics comes naturally.
5. The educational system is somehow irreparably broken.
6. There exist achievement gaps in mathematics.
7. It is not important to attend to identity when teaching mathematics.
8. Mathematics is neutral and its teaching apolitical.

By raising, examining, and questioning these beliefs, we hope to step outside the usual discourses and undertake authentic and substantive efforts to improve the teaching and learning of mathematics. The book contains ideas for small changes that educators can implement in their classrooms, buildings, systems, and beyond to chip away at these commonly held, harmful beliefs as well as recommendations and resources for further learning. This book study guide aims to engage you in the work of challenging these beliefs while making space for reflection, highlighting opportunities to share and work with others, and supporting the implementation of various strategies found throughout the book.

We know professional development is important to teachers, but we also recognize that there are a lot of demands on your time. We have deliberately designed this book study guide to be collaborative so that you learn with and from your colleagues. Each book study participant comes to the group ready to share in-class strategies and activities. That way everyone gets the benefit of all of the ideas *Bad at Math?* has to offer, without having to personally practice every strategy.

By the end of the book study, as a group you will have had opportunity to do any or all of the following:

- Discuss ways to push back against commonly held yet harmful beliefs around mathematics and mathematics education.
- Identify open-ended and open-middle problems you can use with your classes.
- Develop a better understanding of your own math identity and implicit biases, including how these impact your teaching.
- Discuss how you can learn about your students' identities and craft mathematics around these.
- Help students identify the mathematics all around them.
- Create an experience or event that brings mathematically able people into your classroom/school to share their experiences with students.
- Consider ways to support the idea that we are all math people.
- Learn about and incorporate effective praise into your teaching.
- Build upon and strengthen your use of nontraditional teaching practices including active learning, building upon students' experiences, and incorporating history in your teaching.
- Consider the non-neutral aspect of mathematics education.
- Incorporate a *math for social justice* lesson into your teaching.
- Reflect on teacher professionalism and the ways you can engage with the teaching profession beyond your classroom teaching.
- Strengthen the bonds you have with the teachers you work with throughout this book study.

The book study guide is arranged by chapters. We acknowledge that some of the chapters are very full and that the discussions and activities if completed as written might be beyond that which can be accomplished in one session depending on the length of the session. Please be flexible with the content. You may choose to devote two sessions to a particular chapter or to pick and choose among those activities and discussions that you might want to focus on if you want to complete these in one session. Take the time to make the book study your own.

We've even created an "*Into the Classroom*" *Activity Recording Chart* (see the recording sheet at the end of this guide) so that you have a record of the activities/strategies that you and your colleagues have tried over the course of the book study with notes about what you did, what worked, and what you would change.

Thank you for selecting *Bad at Math? Dismantling Harmful Beliefs That Hinder Equitable Mathematics Education* for your book study. And thank you for the challenging yet joyful work you do every day to teach mathematics and more to your students.

2. Reflect on the quote, “The idea that identity is not a necessary consideration in the teaching of mathematics serves to obscure the reality that identity is in fact being attended to, though not for all students.” Whose identities are being attended to in your classes, in your school community, and beyond when it comes to mathematics?



Into the Classroom (before group meeting)

1. Have students write a math biography highlighting their experiences with mathematics. For younger children, have them draw a picture of themselves doing math (working with patterns, completing a puzzle, counting, playing with blocks, etc.).

CHAPTER 8: Achievement Gaps or Opportunity Gaps?



Synopsis:

- Reframes achievement gaps as opportunity gaps in mathematics
- Considers what a lack of instructional and personnel resources means to mathematics teaching
- Explores how the move to remote learning due to the COVID-19 pandemic is an example of an opportunity gap
- Considers how you can use your privilege and position to challenge the existence of opportunity gaps in math and beyond, across educational settings



Reading Timeline (here's how you might divide the reading into manageable segments)

- **Day 1:** Read from the beginning of the chapter to the heading *Where Are the Opportunity Gaps, and Why Do They Persist?*
- **Day 2:** Read from *Where Are the Opportunity Gaps, and Why Do They Persist?* to the end of the chapter.



During Reading

1. Reflect on the schools you attended or have worked at. How do they compare to others in your state/province when it comes to resources and opportunities around mathematics learning? How does it compare to the school in which you work now with respect to these?

CHAPTER 9: Is the School System Broken?



Synopsis:

- Considers and challenges the argument that the public school system is broken
- Explores the differences in how schools serve students based on the historical development and purposes of public education
- Considers multiple purposes for schooling
- Explores teacher professionalism
- Highlights ways to expand teachers' roles and influence in the educational system



Reading Timeline (here's how you might divide the reading into manageable segments)

- **Day 1:** Read from the beginning of the chapter to the heading *Questioning the Existence of a Meritocratic System*.
- **Day 2:** Read from *Questioning the Existence of a Meritocratic System* to the heading *Teachers as Scapegoats*.
- **Day 3:** Read from *Teachers as Scapegoats* to the end of the chapter.



During Reading

1. Reflect on how the schools that you attended fit within the five schools Anyon (1980) describes. How does the school in which you work fit within this model?

2. Reflect on how you might infuse social justice issues into your teaching.



As a Group

1. Share with your colleagues a problem or activity that you use with your class. What values/content is taught in this problem or activity beyond mathematics itself?

2. Discuss the affordances and challenges of infusing social justice issues into your teaching. What supports and barriers exist at your school, in the broader community, and among the parents of the students you teach?

CHAPTER 11: Where Do We Go From Here?



Synopsis:

- Considers next steps for readers with respect to the content of the book
- Challenges readers to act upon what they have learned to challenge harmful beliefs that exist around mathematics and mathematics education
- Positions teachers, instructional leaders, and administrators as uniquely qualified to improve mathematics education in substantive ways



During Reading

1. Reflect on the quote, “Until we move past the current set of beliefs that many in society have about mathematics and mathematics education, we will continue to miss opportunities to ensure that many more among us grow to enjoy, appreciate, and understand mathematics.” How might you work to move society past these beliefs?

2. List one way that you can push back against the harmful beliefs that exist around mathematics and mathematics education.



As a Group

1. Share your experiences with Chapter 10's "Into the Classroom" activities. What went well? What did you struggle with? How might you modify what you did going forward?

2. Reflect on and discuss the following poem. In what ways can you live the ideals of the poem in your daily work?

I am only one,
But still I am one.
I cannot do everything,
But still I can do something;
And because I cannot do everything,
I will not refuse to do the something that I can do.

(Grover, 1909, p. 28)

3. List three things you commit to doing to incorporate the ideas in this text into your teaching and work in general. Share your list with your colleagues.

“INTO THE CLASSROOM” ACTIVITY RECORDING CHART

CHAPTER 1: What Does It Mean to Be Good at Math?

PROMPT: Take a closed problem that your group rewrote and implement it in your classroom.

ACTIVITY/STRATEGY:
What I Did:
What Worked:
What I Would Change:
What I Will Try to Do Regularly:

PROMPT: With students, discuss what it means to be good at something. Have them develop a list of characteristics about how one becomes good at something.

ACTIVITY/STRATEGY:
What I Did:
What Worked:
What I Would Change:
What I Will Try to Do Regularly:

CHAPTER 2: Beyond Numbers and Equations: What Is Mathematics?

PROMPT: Incorporate a problem or activity you identified from an area not typically covered in the K–12 curriculum into your class this week.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

PROMPT: Ask students to share with you what mathematics is to them. As a class, create a word map or a collage using images they find in magazines or draw themselves. Push them to include a wide array of areas and images.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

CHAPTER 3: Mathematicians and Mathematicians in Training

PROMPT: Design an event with your colleagues where you invite a mathematically able person to speak to your students about how they use mathematics in their lives.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

PROMPT: Choose a mathematician from a diverse background whose story you will share with your class. You can do this by reading one of the picture books listed, viewing a film, or incorporating the story in some other way. Ask your students to reflect on the story and share their thoughts about the mathematician.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

CHAPTER 5: Identity in Mathematics Education

PROMPT: Create a problem/activity that builds upon the experiences of your students and implement it.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

CHAPTER 6: School Mathematics

PROMPT: Implement one strategy for incorporating the practice standards or social-emotional learning into your teaching.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

PROMPT: Take one of your lessons and find ways to make students more actively engaged during it. Change even just one thing about the lesson to make students more active during it. Implement the revised lesson.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

PROMPT: Find out the history behind a certain concept you are teaching or a mathematician who worked on that concept and share this with students. Alternatively, connect some aspect of what they are learning this week to their experiences or to some aspect of society or popular culture.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

CHAPTER 7: Mathematics as Gatekeeper

PROMPT: Use the non-test-based method you developed for assessing student work.

ACTIVITY/STRATEGY:

What I Did:

What Worked:

What I Would Change:

What I Will Try to Do Regularly:

CHAPTER 10: Teaching Mathematics as a Political Act

PROMPT: Implement the *mathematics for social justice* lesson you designed with your class.

ACTIVITY/STRATEGY:
What I Did:
What Worked:
What I Would Change:
What I Will Try to Do Regularly:

References

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