# TIPS4AR Book Study Shell

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## Course Description

*Use the following course description/advertisement to disseminate information about the Book Study to recruit participants. Adjust the description as appropriate for your state/district/school. We encourage you to be creative in your visualization of this material!*

[Insert name, organization, department, district, or school name here] is hosting a Book Study to help middle school mathematics and special educators deepen their understanding and develop specific strategies to increase student understanding of algebraic skills. If you provide mathematics instruction as a core teacher or support students within a core mathematics class or a resource classroom in Grades 6–8 and want to collaborate and learn from other teachers, this Book Study is for you!

**Overview.** Participants in the Book Study will work through the book, *The Math Pact*. *Achieving Instructional Coherence Within and Across Grades: Middle School* (Bush et al., 2020[[1]](#footnote-2)), along with additional reading materials as needed. The content for this Book Study was developed independent from the authors of the book and is not a reflection of their opinions. *Optional: A lesson study will accompany the readings to allow teachers to practice and apply new skills. Teachers also will have an opportunity to implement and provide feedback to lessons and assist in writing lessons.* The Book Study will be hosted by [insert name, organization, department, district, school].

**Purpose.** To equip teachers with specific evidence-based strategies to increase all students’ conceptual understanding. Specifically, we will discuss how to implement specially designed instruction and scaffolds for students with disabilities and students at risk/struggling in mathematics to be successful.

**Schedule.** We will meet [twice a month] during [the spring of 2023 (January–June) after school/early evening on Tuesdays or Wednesdays] to meet the needs of participating general and special educators. Participants should anticipate spending 1–2 hours per week on the course.

**Incentives.** [If participants will receive an incentive to participate in the Book Study, include that information here. If not, delete this section.]

**Applications.** Due by [enter date]. We plan to select # educators and will notify participants by [enter date]. The first session will begin the week of [date]. You can access the application here: [insert link].

## Application

*For larger districts and/or schools attempting to maintain an intimate group at or below the recommended 40 participant cap, consider adapting the following application template to construct a committed and diverse team for each book study cohort. Schools may want to consider putting this application into an online form.*

1. Name
2. Email address
3. Location (obtain home addresses if planning to mail books)
4. Grade level (select all that apply)
   1. Grade 6
   2. Grade 7
   3. Grade 8
5. Role
   1. General education mathematics teacher
   2. Special educator
   3. Math interventionist
   4. Curriculum specialist
   5. Other [fill in the blank]
6. Describe your school (e.g., sixth through eighth grade urban middle school serving 1,000 students)
7. Briefly describe why you want to participate in the Book Study. What do you want to learn?
8. Reflect on your mathematics instruction. What are your strengths? What do you see as areas of growth?
9. Please select your preferred time to meet. We will meet for X minutes, X times per month *(provide time options for participants)*.
10. Please select your preferred day to meet. We will meet for X minutes, X times per month *(provide day options for participants)*.
11. I agree to attend at least X of the X Book Study sessions.
    1. Yes
    2. No
12. I agree to devote 1–2 hours between sessions of the Book Study to complete assignments and readings.
    1. Yes
    2. No

Note: Once the application closes, change the setting that allows you to display a message when folks click on the application link to thank them for their interest and let them know the application has closed.

<https://docs.google.com/forms/d/1e2UWQRv5uMv1LRz6whIMAUWfXDSQA2s6fv9IJ1PHDlY/copy>

## Mathematics Inventory Questions

*Use and tweak the following mathematics inventory questions to measure pre-post book study knowledge. For electronic dissemination, consider creating a Google Form or other electronic form.*

Name:

Degree (select all that are applicable)

* Bachelor’s in special education (traditional teaching program)
* Bachelor’s in mathematics education (traditional teaching program)
* Master’s in special education
* Master’s in mathematics education
* Other degree

Certification (select all that are applicable)

* Traditional certification in special education
* Traditional certification in middle school mathematics
* Traditional certification in middle school content other than mathematics
* Alternative certification in special education
* Alternative certification in middle school mathematics
* Other and additional certification(s)

How long have you been teaching special education, including this school year?

* Not applicable
* 1–5 years
* 6–10 years
* 11+ years

How long have you been teaching middle school mathematics, including this school year?

* Not applicable
* 1–5 years
* 6–10 years
* 11+ years

*Please rate your level of agreement with the following statements based on typical in-person teaching, not hybrid or virtual. If you are a co-teaching special educator, please respond about how you assist your co-teacher or how you are able to integrate into small groups, specially designed instruction, and/or pullout support.*

I feel confident in my ability to integrate concrete representations in most of my units during typical, in-person teaching.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I am able to ask questions that lead to student discussions.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

Student engagement is very high in my classroom, with students actively engaged in learning, asking questions, participating in small groups, and so forth.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I have materials, such as algebra tiles, place value materials, or fraction pieces, to integrate into my teaching.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

Many of my students have a deep understanding of mathematics.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I can identify and often plan my teaching to address common misconceptions to support students who struggle in mathematics, including those receiving special education services.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I can identify and plan my teaching to address common characteristics of students who struggle in mathematics, including those receiving special education services.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I explicitly teach mathematics vocabulary.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I model the use of precise mathematics words and ensure that students use precise language in mathematics.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

I select mathematics tasks that have multiple ways to solve and lead to student discussions.

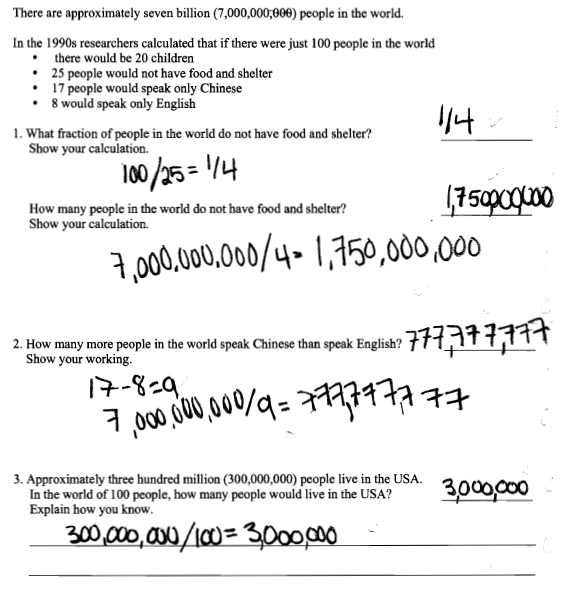
1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree

**Review the problem and the student work.**

First, answer these questions.

1. Why might students struggle with this problem?
2. What prerequisite skills are needed for students to be able to solve this problem?

Now score the student work. (from NAEP assessment)

**

1. What is the number of correct answers?
2. How would you rate the level of understanding of using real data and proportions?
   1. Excellent
   2. Good
   3. Average
   4. Poor
3. Are there any mathematical misconceptions that will need to be addressed? If yes, what were the common misconceptions and how do you know?
4. What would be the next step to help students develop understanding of the skills presented?

**Complete the following problems.**

1. To assess her students’ prior knowledge about evaluating arithmetic expressions, Ms. Santiago assigned a worksheet of problems. She noticed that Alexis answered the first two incorrectly and the next two correctly.
2. 7 × 2 – 6 + 3 = 5
3. 9 – 5 + (16 ÷ 8) = 2
4. 9 + 24 ÷ 3 – 1 = 16
5. 17 – (3 + 7 × 2) = 0

Which of the remaining problems is Alexis likely to answer incorrectly?

* 8 ÷ 7 – 12 ÷ 3
* 13 – 3 × 2 + 5
* (27 ÷ 3 – 4) + 8
* (16 – 12) × 5 + 10

1. Sheila works 8 hours per day on Monday, Wednesday, and Friday and 6 hours per day on Tuesday and Thursday. She does not work on Saturday and Sunday. She earns $324 per week. How much does she earn in dollars per hour?
2. What prerequisite knowledge is needed to solve this problem?
3. Why do you think some students may struggle to solve?
4. Solve.

Google Forms version: <https://docs.google.com/forms/d/1OMk8B2t-iybiP938-Geqj1pVikfN-sPlQBZg1-VqkpE/copy>

## Feedback Survey Questions

Consider using the following brief feedback questions after each session to facilitate the improvement of instruction at each session in accordance with participant preferences and knowledge levels.

1. In your opinion, what worked well during today’s/tonight’s session?
2. In your opinion, what did not work well during today’s/tonight’s session? What could have been done differently to make the session more effective?
3. Please list any lingering questions or concerns that you may have following this session. Is there any additional information you would like us to cover in the next session?

Google Form Template: <https://docs.google.com/forms/d/1kCZxG1hgKq9g76PiKP4MCfkg3o-7Om2yqiiUyzRKhuE/copy>

## Tips for Success

* Ensure that you can devote at least 60 minutes to each session. Consider 90-minute sessions if feasible.
* Cap the group size at 40 participants. More than 40 participants will likely impede participant engagement.
* Encourage heterogeneity among group participants. Mixed grade levels and a variety of general education and special education roles facilitate deeper discussions.
* Use engagement strategies whenever possible throughout sessions (e.g., Jamboard). Include real mathematics problems as demonstration items to allow for practice of the evidence-based practice and to increase understanding and participation.
* Take attendance to monitor participation and ensure that participants are meeting expectations set for incentives, if applicable (e.g., attending X number of sessions).
* Send out follow-up emails after each session to reiterate expectations and work to be completed by the next session.
* Consider hosting course follow-up activities (e.g., open doors, question-and-answer sessions).
* Create and maintain a central place (e.g., Google Drive) where course materials (and lessons when conducting the optional lesson study) can be organized and archived for long-term access.

## Book Study Outline by Session

Consider using the organizational checklist included in this package of materials to ensure that you have gathered and organized the appropriate materials before and during the book study. The session outline details suggested content for an eight-session book study. Each session includes an associated chapter in the book, objectives to be accomplished during the session, activities to include throughout the session, potential resources to share during the session, and the work that should be completed prior to the session (the previous session’s next steps). A sample syllabus template also has been included in this package of materials that can be adapted for use with any book study group.

### Course Materials Stored in Shared Google Drive

* View-only PowerPoint presentations for each session
* Folder for materials pertaining to each session [including supplementary materials for that session, such as a list of linked resources or a PDF of a required reading(s)], as well as a folder for the course study roster
* Archived Jamboards from previous sessions
* Jamboard[[2]](#footnote-3) template: <https://jamboard.google.com/d/18fB8Iy1AT3CtBTkgZXN5hAv5W3kl8sMjGfI9_O8K57c/edit?usp=sharing>
* Google Sheet for collaborative resource sharing
* Archived chats from any sessions in which resource sharing and insightful reflection occurs in the chat box

| **Session** | **Topic and chapter(s)** | **Objectives** | **Activities** | **Assigned prework** |
| --- | --- | --- | --- | --- |
| 1 | * Introduction * Chapter 1 | * Identify common characteristics of students who struggle with mathematics and students with disabilities. * Describe evidence-based practices and how these practices support student learning. * Define classroom discourse and discuss the impact this has on student algebraic learning and outcomes. | * Whole-group discussion * Small groups with notes in Jamboard 1 * Symbol brainstorm Jamboard 2 * Small-group discussion * Jamboard 3 | * Read Chapter 1 * Pretest (mathematics inventory) |
| 2 | * Role of EBPs * Language of mathematics * Role of discourse * Chapter 2 | * Describe how student discourse can impact conceptual and algebraic understanding for middle school students. * List several high-leverage practices (HLPs) and evidence-based practices (EBPs) that support student discourse. * Establish the value of using technical mathematical terminology and vocabulary when teaching all students, including students who struggle with mathematical concepts. * Identify how students’ language abilities affect their success in mathematics. | * Whole-group discussion * Jamboards 4, 5, and 6 * Small-group discussion | * Read Chapter 2 * Guiding questions   + Why is consistent mathematical language essential during instruction?   + How should you introduce vocabulary in mathematics lessons?   + How does vocabulary instruction differ in mathematics compared with other content areas?   + How does mathematics discourse differ from conversational language? |
| 3 | * Understanding student needs * Notation * Chapter 3 | * Describe common challenges in meeting the needs of students who struggle in mathematics. * Identify ways to collaborate across grade levels and between core and special education that assure student success in mathematics. * List common notations and symbols used in secondary mathematics courses. | * Whole-group discussion * Jamboard 7 (slide 4) * Jamboard 8 (slide 9) | * Read Chapter 3 * Read “Creating Optimal Opportunities to Learn Mathematics” * Student responses for equals sign prompt * Guiding questions   + How do you explicitly teach symbols or notations?   + Why are symbols and mathematical notations so challenging for students?   + How do symbols and notations impact student success and understanding? |
| 4 | * Representation * Chapter 4 | * Describe the impact of using representations to communicate mathematical thinking. * Differentiate multiple representations and identify the impact of using multiple forms. * Identify how representations increase student conceptual understanding. * Recognize how to incorporate more representations into your classroom. | * Whole-group discussion * Jamboard slides 9, 10, and 11 * Breakout, small groups | * Read Chapter 4 * Guiding questions   + What are representations, and what are the categories of representation?   + What challenges should we consider when planning instruction on representation?   + How do students benefit from the use of representations? |
| 5 | * Rules that Expire * Misconceptions * Chapter 5 | * Inventory commonly used rules that expire (RTEs) and provide instructional alternatives. * Describe the advantage of teaching a schema-based approach to word problems. * Identify the impact of keyword-focused instruction and strategies for solving word problems. | * Whole-group discussion * Jamboard slides 12, 13, 14 * Breakout, small groups | * Read Chapter 5 * Whole-group discussion * Guiding questions   + Why have we previously relied on RTEs?   + How might RTEs interfere with student learning?   + What supports do you have in place that help students determine if rules are generalizable? |
| 6 | * Generalizations * Chapter 6 | * Describe the differences between generalizations and rules. * Promote how generalizations support student reasoning and pattern identification. * Identify tasks and strategies that promote student skill generalization. * Recognize common student struggles and EBPs that promote learning. | * Whole-group discussion * Small groups * Jamboard slides 15–20 | * Read Chapter 6 * Read article: “Developing Concepts and Generalizations” * Guiding questions   + Why is generalization important?   + How do generalizations support student reasoning and pattern identification?   + What are you currently doing to facilitate class discussions and tasks that support generalization? |
| 7 | Chapter 7 | * Describe how collaboration can impact student learning. * Identify elements that cultivate collaboration. * Discuss ways to integrate these ideas and begin classroom implementation. | * Whole-group discussion * Small breakout groups * Jamboard 2: Slides 1 and 2 * Note: A new Jamboard 2 is started for this session | * Read Chapter 7 * Pick one article to read:   + “When Students Use Technology Tools, What Are You Noticing?”   + “Launching a Mathematical Model Lesson” * Guiding questions   + To what extent do your lessons and units already embody some of the ideas?   + How can collaboration and discourse further student learning?   + How have you previously integrated new learning approaches into your instruction? |
| 8 | * Putting It All Together * Chapters 8 and 9 | * Identify Math Pact principles and specific EBPs that support student learning in mathematics. * Reflect on your plan for incorporating principles from the book into your mathematics instruction. | * Whole-group discussions * Annotation and feedback * Small-group discussion and problem solving * Jamboard 2: Slides 3, 4, and 5 | * Read Chapters 8 and 9 * Guiding questions   + How has or how will your instruction change?   + How will you share the information that you learned?   + What is the greatest takeaway from this study?   + As I reflect on these experiences, what can I pull from them to facilitate forward momentum in my setting? |

1. Bush, S., Karp, K., 7 Dougherty, B. (2020). *The math pact, middle school. Achieving instructional coherence within and across grades*. Corwin. <https://us.corwin.com/en-us/nam/the-math-pact-middle-school/book270983> [↑](#footnote-ref-2)
2. Jamboard will be used throughout the Book Study. The Jamboard activities can be done easily in person via chart paper, small groups, or as individual workbooks. We recommend that as participants complete the activities in-person, that time is built in to share in small groups, peer-to-peer, or are reviewed from chart paper. [↑](#footnote-ref-3)