

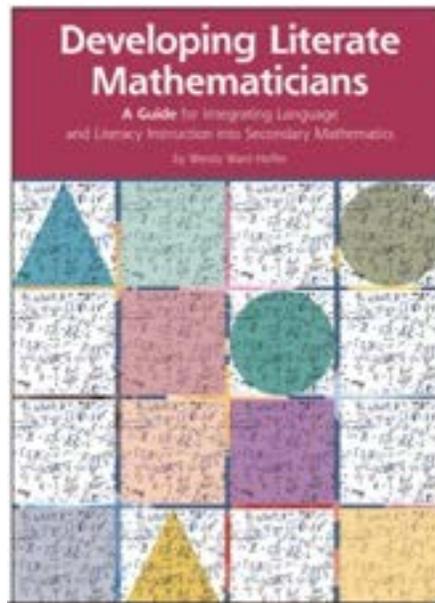
Study Guide

Developing Literate Mathematicians:

*A Guide for Integrating Language and Literacy Instruction
into Secondary Mathematics*

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The purpose of the book, *Developing Literate Mathematicians*, is to offer teachers a roadmap for integrating authentic disciplinary literacy learning into their mathematics instruction in service to content learning. The purpose of this study guide is to support educators in exploring the ideas in the text and integrating intentional literacy instruction frequently and deliberately into students' mathematics learning experiences in order to deepen understanding.



Before Reading

Discussion Questions:

- In addition to preparing learners to succeed on standardized assessments, why is mathematics education important?
- Similarly, why is literacy important?
- How can literacy instruction support mathematical success?
- What are your beliefs about math teachers' roles in literacy instruction?
- In what ways are you presently, intentionally integrating literacy instruction into your math courses?

Activities:

- Keep track for a week of all the occasions when you wish students had a deeper understanding of reading, writing, vocabulary, discourse to support their math learning.
- Record each time you offer explicit instruction in reading, writing, vocabulary, discourse.
- Research a great mathematician and consider the ways in which literacy was a part of her or his work.
- Notice how you as a citizen and a mathematician encounter a need for mathematical literacy in your life outside of school.
- Write a letter to your students about your beliefs about the importance of both literacy and mathematics and their interrelationship.

During Reading

Chapter 1: Literacy for Mathematicians

Discussion Questions

- Of the reasons given for why general literacy matters, which are most compelling to you?
- What sorts of disciplinary literacy instruction do you see students needing most?
- What do you wish English language arts teachers knew or understood about the disciplinary literacy of mathematics?
- How do you feel about the suggestion that you are responsible for literacy instruction?

Activities

- Share the statistics on pages 4 – 6 with students and invite discussion.
- In planning your instruction, focus on one NCTM Mathematics Teaching Practice each day, and notice how that Practice invites intentional literacy instruction.
- Set a goal for yourself of adding one element of literacy instruction into your courses on a regular basis. Which would it be? How might that look?

Chapter 2: Apprenticing Mathematicians in a Workshop

Discussion Questions

- Of the rationale given for math workshop, which suggestions do you find most compelling?
- What do you already know and do with workshop model math instruction?
- How do the ideas in this chapter confirm or contrast with your current instructional practice?
- Where do you find / how do you develop rich tasks for math learners?
- How do you or might you invite learners to reflect? How do you use data gathered from reflection?
- What aspects of classroom culture have you intentionally cultivated or might you need to cultivate in order to foster student learning in a math workshop?

Activities

- Download the workshop planning template from the NCTM website (code is on front page of the book). Use it to plan and teach a workshop model lesson. Invite a colleague who has read the chapter to come in and observe and offer you feedback.
- Reflect on a recent workshop model lesson in light of the graphic on page 25. In what ways did you maximize opportunities to integrate the Common Core Standards for Mathematical Practice?
- Catch yourself rescuing students and strategize ways that you could instead begin to support their thinking.
- Plan intentionally for student reflection every day for one week. Use the data to drive the next day's instruction.

Chapter 3: Reading as Mathematicians

Discussion Questions

- Where do you see your students' strengths as readers? What are their challenges?
- How would you explain the importance of reading in mathematics to students?
- Of the genres listed on pages 42 – 43, which do you see as most challenging to readers? What supports do they need?
- Which thinking strategies might serve your students best? How have you or might you integrate explicit thinking strategy instruction into your workshops?

Activities

- Have a discussion with your students about how they use their reading skills in math, and how reading in math can be different from reading in language arts.
- Download the problem solving scaffold from the NCTM website. Use this scaffold yourself to solve a challenging math problem. Reflect on what this might mean for your instruction.
- Try offering the problem solving scaffold to students along with a juicy problem in an upcoming workshop.
- Download the Planning Template: Teaching a Thinking Strategy. Use this to plan instruction.
- Invite a colleague to come and watch you teach a thinking strategy to students in the context of a math workshop. Reflect together on how that went.

Chapter 4: Developing Vocabulary for Mathematical Understanding

Discussion Questions

- How effective do you feel students are as vocabulary learners?
- When you consider the descriptions of Tier 1, 2 and 3 words, what are your thoughts about how to best invest students' vocabulary learning time?
- Remember how you learned vocabulary in secondary school. What would you say now to those teachers about their methods?
- Talk back to the Principles of Effective Vocabulary Instruction on page 66 – 67. Of those, which make sense and are most practical? Which seem difficult and why?

Activities

- Select one of the Vocabulary learning activities on Pages 72 – 73 to try out with students. Reflect with them on how it goes.
- Download and use the Vocabulary Instruction Planning Template.
- Experiment with different approaches to vocabulary instruction in different class period. Assess learners' comprehension with a pre- and post-quiz. Notice which groups grew most and consider the relationship between student achievement and instructional methods.

Chapter 5: Engaging in Mathematical Discourse to Deepen Understanding

Discussion Questions

- What are some occasions when you invite learners to discuss in math class?
- What are some reasons you may limit student discourse?
- How skilled are your student in engaging in engaged, accountable conversations about their learning? What might they need to become even more effective?
- How do you intentionally cultivate classroom culture that supports discourse?
- What is your experience with conferring?

Activities

- When planning an upcoming workshop, intentionally select a generative topic for learners to discuss.
- Scaffold student discussion by offering learners questioning strategies from the table on pages 86-87.
- Select a new "little discourse" idea from pages 90 – 91. Explicitly teach and model the structure with students. Invite a colleague in to process observe as learners use this structure; reflect together.
- Look ahead in your planning and identify an opportunity to engage students in "big discourse." Consider inviting a colleague to observe as well.

Chapter 6: Writing as Mathematicians

Discussion Questions

- How do you yourself feel about writing?
- How do you feel about reading or grading student writing?
- How useful do you find sentence stems in promoting student discourse and writing?
- Is writing in math worth the time? Why or why not?
- How might you integrate big writing projects into your math instruction?
- How do additive rubrics compare with the sorts of rubrics you have been seeing and using?

Activities

- Try out a “little writing” task with students.
- Practice peer critique with learners around some little writing pieces.
- Create an opportunity for students to engage in a “big writing” task in an upcoming unit. Before assigning to project to learners, test drive it yourself. Notice what comes easily and where challenges may lie.
- Design an additive rubric for your upcoming “big writing” task.
- Share your students’ writing with colleagues; discuss how the writing demonstrates student understanding.

After Reading

Discussion Questions

- How does your learning from this book support you in addressing the Common Core or other Standards for which you are responsible?
- Of all the suggestions in this book, which are most useful and practical?
- What questions about integrating literacy into math instruction remain?

Activities

- Set goals for adjusting your instructional practice to more intentionally integrate literacy instruction; invite a peer to hold you accountable for following through. Gather student assessment data to determine if your new strategies are promoting achievement.
- Celebrate your successes! Create a place in your building or online to share your and your students' work.
- As a study group, compile your comments and questions, and send those to the author, Wendy Ward Hoffer, whoffer@pebc.org. She will write back!