Strategies for Mathematics Instruction and Intervention, K–5

By Chris Weber and Darlene Crane

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Study Guide

This study guide is a companion to the book Strategies for Mathematics Instruction and Intervention, K–5 by Chris Weber and Darlene Crane. Strategies for Mathematics Instruction and Intervention, K–5 assists mathematics teachers in structuring strong mathematics programs through adding response to intervention (RTI) to the curriculum and prioritizing which mathematics standards are most crucial.

This guide is arranged by chapter, enabling readers to either work their way through the entire book or focus on the specific topics addressed in a particular chapter. It can be used by individuals, small groups, or an entire team to identify key points, raise questions for consideration, assess conditions in a particular school or district, and suggest steps that might be taken to promote a healthy school culture.

We thank you for your interest in this book, and we hope this guide is a useful tool in your efforts to create a healthy culture in your school or district.
1. What do the authors consider the greatest current obstacle to students gaining the knowledge that they will need to succeed in college or in careers? How has this obstacle manifested itself in your experience with students?

2. What have the authors found to be the easiest way to determine a prioritized standard?

3. Consider Bethany Rittle-Johnson’s, John Van de Walle’s, and the authors’ definitions of procedural knowledge. Which definition do you prefer, and why?

4. Why do the authors believe that the terms concepts and applications shouldn’t be considered synonyms? How do they draw distinctions between these two terms in regard to education?

5. What does the phrase “mile wide, inch deep” mean? How may this phrase describe how mastery of taught material is attempted in grades K–8 in the United States, in contrast to the amount of material that is covered in grades K–8 in Germany and Japan?
6. Review the bulleted points given for why defining key core content is crucial, featured on page 20. What reason for highlighting key core content would you add to this list, and why?

7. In your school, start a dialogue with your fellow mathematics educators to collaborate on next-generation standards to prioritize in your curriculum, both horizontally and vertically. What did you learn from this dialogue?
1. List the five steps that educators should take in forming conceptual units. What do the authors consider to be the key lever of RTI, and why is it pivotal to designing a unit of instruction?

2. What is the most prominent form of assessment used in schools? What is the only learning target that this kind of assessment is equipped to assess? Briefly describe the four main types of learning targets.

3. Why is it important that educators commit to performing midlesson checks for understanding and that they pass out end-of-lesson exit slips in order to inform their lessons?

4. What does educational psychologist Benjamin Bloom’s concept of mastery learning draw attention to?

5. How can collaboratively developed scoring guides ensure that teams of educators have a common understanding of proficiency? What must teacher teams do in order to accurately use scoring guides?
6. How can an understanding of self-assessment benefit students? How can they grow from self-assessment, and what can they do when they start to self-assess?

7. Why is it no longer sufficient to just require students to show their work and come to correct answers? What must they instead be able to do in order gain conceptual understanding of what they have been taught?

8. What are the eight mathematics abilities that students should have if they are to be successful 21st century learners?
Chapter 3

Understanding the Prioritized Standards

1. Why may the work of vertical collaborative teams carry as much importance as same-grade collaborative teams?

2. In your own words, what do the authors of *The Mathematical Education of Teachers* consider the three areas of understanding that mathematics educators need to fully grasp in order to successfully teach their subject?

3. What wisdom can you take away from the successful process of prioritizing standards in the Myers Elementary example?

4. What are the three facets of mathematics that students must conquer?

5. In mathematics learning, when are initial experiences with data the most significant?
1. Consider the practices that the NMAP identifies as effective influences on student learning, listed on pages 67–68. Which one have you found to be the most crucial, and why? On which of these instructional practices do you think you need to do the most work?

2. How have you incorporated real-world applications of mathematics into the classroom to help students see how mathematics surfaces in their everyday lives and how employing math can help them through life problems?

3. What is a *virtual manipulative*? What do the authors suggest that concrete manipulatives and virtual manipulatives be used to do?

4. In your own words, define *assessment* as *learning*, *self-regulated learning*, and *metacognition*. How are these terms interdependent, and how are they different?

5. How can writing in a journal help students with their mathematical learning?

6. Should all parts of mathematical learning include metacognition? Why?
7. What did observational research find to be a main difference between the questioning techniques of teachers in the United States and the questioning techniques of teachers in China?

8. In what ways do you devote classroom time to ensuring that students cultivate the mathematics vocabulary they need? How do you work to use terms consistently so that alterations in meaning do not hinder students’ learning?
1. The authors highlight that teachers’ confidence and productiveness positively influence student mathematics achievement and that teachers must help students grasp that their mathematics attainment relies on diligence rather than inherent skill. What do you do to enhance your and your students’ confidence?

2. What needs do Tier 2 and Tier 3 interventions address? When are these supports necessary?

3. The authors state that school staff should end the school year by compiling a list of students requiring intensive supports for foundational skills at the beginning of the next year. How do you assemble information on students so their future teachers are prepared to support their learning? What could you do to improve your current end-of-the-year screening practices?

4. Consider the examples featured on page 112 of what educators can predict and what they cannot predict regarding students’ comprehension and performance of mathematics concepts. What can and cannot statements of your own would you add to the provided examples?
5. Carry out the diagnostic activity the authors describe that involves sitting with a student for twenty minutes to present grade-level-appropriate math problems and to observe his or her mathematical thinking by asking questions about his or her process. What knowledge about this student do you gain from the diagnostic activity, and how may it influence the supports you provide to this student?

6. What is a buffer?

7. Review the list of indicators that can gauge an RTI’s success, featured on page 129. What indicator would you add to this list, and why?