

CHAPTER 6: Mathematicians Rise to a Challenge

In this chapter, I focus on the role of the problems we assign in supporting or undermining students' agency, independence, and perseverance.

Discussion Questions

Page 113 Discuss or journal about the comparison between Jen's language ("Oooh, a challenge, cool!") and the more typical language on page 113. If this is something you need to work on, how will you start?

Pages 129–131 Discuss or write about the section "Productive Struggle, Be Less Helpful, and Special Education." Does this resonate with your experiences?

Pages 132–133 Discuss the critique of "high, medium, and low" language. These terms are common in education. What would it mean to stop using them?

Pages 133–136 Discuss or journal about the final section of the chapter, "Developing the Skills and Content Expertise to Challenge Students." What resonated with you, personally? What goals might you consider, going forward?

Activities

Pages 113–115 Be Less Helpful

As a group, watch Dan Meyer's *TED Talk* and then discuss your curriculum. Where does it fall? How does it measure up? Is it too helpful and in need of a makeover? Ask your colleagues to bring tomorrow's lesson to this session so you can get specific. Where, exactly, is the curriculum too helpful? How might you revise it?

Pages 115–117 Makeover Blogs

Ask participants to read Fawn's blog post. Point them to the collection of additional makeover blogs at tjzager.com (Chapter 6) or stenhouse.com/becomingmathteacher. Ask each participant to choose one blog to read. Host a jigsaw or discussion after. What do participants notice? What are they wondering?

Page 128 Flat Soda

Take a whack at the soda problem. What makeovers would improve it?

Pages 129–131 Too Many Rules

"Without an understanding of the mathematical relationships, each new situation demands a new rule" (Behrend 2001, 37). Behrend cited the rules around lining numbers up for computation. Can you think of other examples? Generate a brainstormed list wherein we teach multiple procedural rules instead of mathematical relationships. Going forward, coaches and teachers can prioritize revising instruction for these areas.



CHAPTER 6: Mathematicians Rise to a Challenge (continued)**Calls to Action****Pages 124–128** **Low Threshold, High Ceiling, Open Middle**

Discuss Papert's image of low-threshold, high-ceiling problems. Does it resonate? Choose a problem from an upcoming lesson and talk about how to lower its threshold and raise its ceiling. What changes did you make? Once you're done, think about the same problem in terms of open or closed beginnings, middles, and ends, as Dan Meyer described. Any further changes?

Page 128 **The Makeover Experiment**

Choose one problem to make over, and rewrite it a few different ways with your team. If you can work it out, the ideal situation would be to test three variants: one colleague would teach the problem as written, one colleague would teach one makeover of the problem, and a third colleague would teach a different makeover of the same problem. If you can work out the sub coverage, try to go to one another's classes and observe the results. If not, perhaps video? No matter what, come together and compare teachers' observations and student work. Which problem brought you the best results? What were the costs and benefits of the different makeovers? Please share what you learned at tjzager.com (Chapter 6).

Pages 131–133 **Margin Symbols**

Experiment with margin symbols. What do you notice? Report back to your colleagues and post at tjzager.com (Chapter 6).

Additional Resources

At stenhouse.com/becomingmathteacher and at tjzager.com, you'll find a collection of supplemental resources that may come in handy for further thinking and discussion. I keep the links fresh, so the contents will change, but you will certainly find:

- Dan Meyer's *TED Talk*, Phil Daro discussing "answer getting," and a BBC documentary from Andrew Wiles
- A collection of makeover blogs so you can see examples at different grade levels
- Resources for low threshold, high ceiling, open middle, and productive struggle

