

Adapting an instructional routine: Stronger & clearer each time

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ARTICLE

Abstract: How can math teachers help students take notes that are useful and also promote thinking and reasoning? In this article, the instructional routing Stronger and Clearer Each Time facilitates student discourse around a learning goal, helps students to create meaningful notes, and allows the teacher to better understand student thinking.

Keywords: Teaching and Learning, routines

Classroom routines can form a foundation for everyday teaching and learning (Kelemanik, Lucenta, & Creighton, 2016). Routines help to get a class started, to distribute materials, or to transition between activities. With routines, students can think less about what to do next or how to participate in an activity, which shifts the focus for students and teachers to mathematical ideas. Stronger & Clearer Each Time (S&C) is an instructional routine designed to support both mathematical understanding and language development (Zwiers, Dieckmann, Rutherford-Quach, Daro, Skarin, Weiss, & Malamut, 2017).

As a classroom teacher, I have adapted the S&C routine to fit my goals and better support my students' learning. I adapt S&C by asking students to write notes summarizing the ideas of a discussion, often with the prompt to write as if the notes are for a future forgetful self. I use this framing to build on the idea of "meaningful notes" (Liljedahl, 2018), where I structure note-taking as an opportunity to occasion student thinking and create useful resources rather than copying information without thinking.

After giving students a few minutes to write, I use a spreadsheet randomizer ([example](#)) to put them into pairs. Then, I ask students to take turns sharing their notes with their partner, adding ideas to their own notes. I then randomize students a second time, and they share again with a new partner to allow students a second chance to share their ideas and hear a different perspective. An alternative is to ask students to talk to a shoulder partner, and then a partner in front of or behind them. Finally,



students take a minute to summarize and clarify any additional ideas they want to have in their notes. I often finish by inviting students to share key ideas with the full class.

In a lesson on finding sums of arithmetic series, I asked students to take notes for their future forgetful self and gave them several minutes to write. When I assigned students partners to share and revise their notes, I walked around listening to their conversations. I noticed a few pairs talking about how when there are n terms in a sequence, there are $n - 1$ “jumps.” That is, if there are 5 terms, the distance from the first to the last term is 4 times the distance between consecutive terms. For instance, in the series $11 + 13 + 15 + 17 + 19$, there are five terms and four jumps. The total distance from the first to the last term is 8, and the “jump” is 2. This can help students to quickly calculate either the number of terms in a sequence or to calculate the final term given the number of terms.

The opportunity to listen in to students’ self-explanations allowed me to address a potential source of confusion in the moment. I asked one group to share their thinking with the class before putting students into new groups to summarize what they heard with a new partner. I encouraged students to add a similar example to their notes when they made their final revision to solidify their understanding of a challenging idea.

The adaptation of the S&C routine affords several opportunities. First, students have to self-generate explanations around key ideas and how they might use them to solve a problem. Self-explanations can help students integrate what they are learning with what they already know and support the transfer of their knowledge in the future (Lombrozo, 2006). By asking students to write notes to their future forgetful self, I hope to prompt them to go beyond summarizing what they learned, and consider how those principles might transfer to new problems. Giving students multiple opportunities to discuss with partners and revise their work increases the quality of their explanations, exposes students to more models of others’ high-quality explanations, and allows them to clarify misconceptions in the moment.

A second benefit of S&C is to teach students that revision is an essential part of learning and that students’ ideas are always valued, especially when ideas are partially formed. Jansen, Cooper, Vascellaro, & Wandless (2016) write:

If rough-draft talk is valued, brainstormed ideas are welcomed. More students are likely to take risks rather than freeze during challenging tasks. Valuing a wider range of contributions invites greater involvement, in contrast to the same students who participate frequently or not at all (p. 304).

S&C enacts rough draft thinking in practice. The teacher goes beyond telling students that rough drafts are valued; the S&C routine shows students the role rough drafts play in their learning by creating a resource through revision that is more likely to be useful to them.

Finally, S&C allows me to elicit evidence of student thinking. By listening in to conversations or looking at notes with revision, I can learn how students are thinking about a new idea and respond to that thinking. Transitions between partners can serve as an opportunity to address common issues, direct student attention to important features of a concept, or prompt students to add something to their notes and conversations. As I listen in to conversations and read student notes, I learn to understand content from a student perspective and see the many ways that students think about mathematical ideas differently than I expect. These opportunities help me to become a more effective teacher.

The S&C routine embodies the practice of mathematicians; rarely are initial ideas polished, and mathematicians revise their work and improve their explanations over time. I love this routine because note-taking can be a low-energy part of class, but with S&C students create useful resources while they rehearse and consolidate their thinking as they share and revise their explanations. My classroom becomes more equitable as I build in time and space for all students to reflect on their learning.

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