

## *Implementation of curriculum*

Teachers who are well prepared in their knowledge of mathematics, students' thinking, and the school's curriculum are positioned to appreciate how mathematical thinking develops over time and are equipped to help students connect topics to strengthen understanding (Ball, Thames, and Phelps 2008). Also, when teachers recognize the importance of developing students' proficiency with the mathematical practices, they can more effectively select and implement appropriate tasks that emphasize mathematical thinking throughout the pre-K–12 years. Instructional materials and tasks selected by schools have a significant influence on what students learn and how they learn it (Stein, Remillard, and Smith 2007). Consequently, teachers need high-quality professional development to maximize the effectiveness of these materials, since even the best textbooks and resources can be misinterpreted or misused.

Given the central role of textbooks as a resource and their potential for supporting instruction, textbook selection should not be taken lightly. This process should consider not only whether textbooks “cover” standards but also whether their development of content reflects learning progressions focused on conceptual understanding and emphasizes the mathematical practices (Bush et al. 2011; NGA Center and CCSSO 2013). As discussed earlier, the Mathematics Teaching Practices promote students' conceptual understanding and proficiency in the mathematical practices. Thus, another important selection criterion is the extent to which a textbook's lessons consistently support these teaching practices.

Appropriate use of textbooks—whether to teach from them lesson-by-lesson almost exclusively or whether to treat them as one resource among many—depends on the quality of the textbook, as defined above. If a textbook develops mathematical topics in a coherent manner, based on learning progressions, and features lessons that consistently support the Mathematics Teaching Practices, then teaching primarily from that textbook makes sense, and significant omissions or deviations can decrease, rather than enhance, the quality of instruction (Banilower et al. 2006). Conversely, if a textbook does not provide such support, then the only option is to treat it as one of many resources and supplement it as needed.

Some schools develop pacing guides to ensure that instruction addresses all the required standards in the school year and spends an appropriate amount of time on each topic. Although these resources can help teachers with long- and short-term planning, the needs of individual classes and students should have priority over rigid curricular schedules. Collaboration among teachers throughout the school year can result in appropriate adjustments and adaptations of pacing guides to address student strengths and weaknesses.

Structuring units—and lessons within the units—around broad mathematical themes or approaches, rather than lists of specific skills, creates coherence that provides students with the foundational knowledge for more robust and meaningful learning of mathematics. In particular, attention to the mathematical practices provides students with important mathematical tools that they need to navigate mathematical situations and contexts. In planning lessons, teachers should also consider the intended standards and the developmental needs of the students. Consequently, careful consideration should be given to appropriate ways to sequence a series of lessons. Daily lesson plans should take into account the broader perspective of what students learned in the past and where they are headed in the future, as well as the contexts that can be used to motivate students and help them understand why particular topics are important.

Reference: National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: Author.