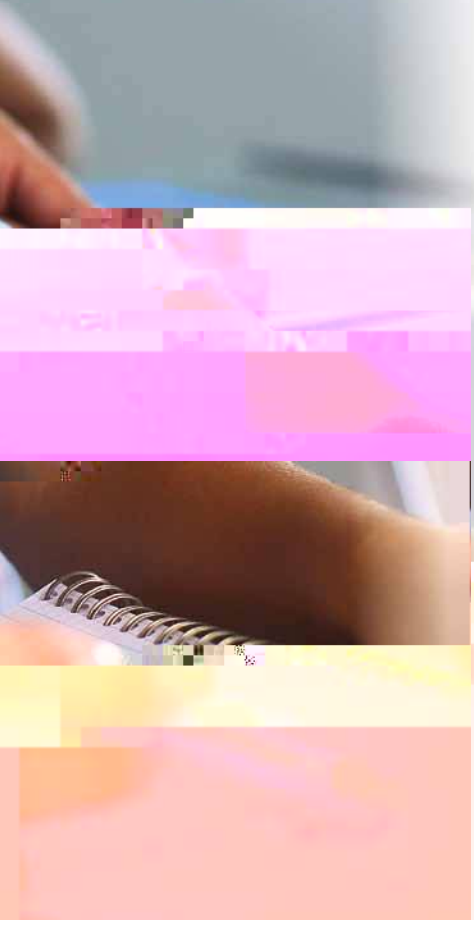
Assessing Basic Fact Fluency

Have you had it with timed tests, which present a number of concerns and limitations? Try a variety of alternative assessments from this sampling that allows teachers to accurately and appropriately measure children's fact fluency.

By Gina Kling and Jennifer M. Bay-Williams



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Think about how you assess reading fluency. Does your assessment plan involve listening and observing as children read as well as asking reading comprehension questions? Now imagine what you might learn about students' reading fluency if you used only timed quizzes. How would your confidence in your assessment change?

Formative assessments—including observations, interviews, performance tasks, and journaling—have become common practice in many classrooms, with a recognition that by using different ways to assess children, we gain a more comprehensive, accurate picture of what they know, what they do not know, and their misconceptions. These data are then used to design instruction accordingly (Wiliam 2011). Yet, in spite of this trend in other areas of education, timed, skill-based assessments continue to be the prevalent measure of basic mathematics facts achievement. As a result, many rich opportunities for assessing basic fact fluency are lost. In this article, we share a variety of ways to formatively assess basic fact fluency. We define fluency, raise some issues related to timed testing, and then share a collection of classroom-tested ideas for authentic fact fluency assessment.

De ning uency

A variety of interpretations exist for what procedural uency (in general) and basic fact uency (specifically) mean. Fortunately, recent standards, research, and reports provide a uni ed vision of what these terms signify. The Common Core State Standards for Mathematics (CCSSM) document describes procedural uency as "skill in carrying out procedures exibly , accurately, efficiently, and appropriately" (CCSSI 2010, p. 6). Likewise, Baroody (2006) describes basic fact uency as "the ef cient, appropriate, and exible application of single-digit calculation skills and . . . an essential aspect of mathematical pro ciency" (p. 22). These de nitions re ect what has been described for years in research

the fact). Accuracy is assessed as soon as the student responds, and ef ciency is observed on the basis of how long it takes a student to solve the fact. Flexibility and appropriate strategy selection are addressed by such follow-up prompts as, “How did you gure it out?” or “How could you use this strategy to solve this fact?” Codes,

Writing provides an excellent opportunity to assess exibility and understanding

words, and numbers to communicate their strategies. For example, gure 2 shows a variety of rst graders' responses to the journal prompt, "If your friend did not know the answer to 4 + 5, how could he gure it out?" Carefully review the responses, considering what they illustrate about the strategies used by the children. In contrast to what can be learned from a child's answer to 4 + 5 on a timed test, these samples offer rich opportunities to recognize which children can appropriately select and explain an ef cient strategy for the task. This is impor - tant for deepening strategy understanding and also is re ected in the expectations of CCSSM and the related, forthcoming assessments. For example, Smarter Balanced Assessment Consortium (SBAC) lists the following as "evidence required" for grade 3. Note the application of strategies inherent in these expectations. The student—

- s multiplies and divides facts accurately ;
- s multiplies and divides facts using strategies, such as the relationship between multiplication and division or properties of operations; and
- s uses multiplication and division facts (SBAC 2012) (emphasis added).

TABLE 3

- Choose one of the problems above and write about how you solved it.
- Tell which helper fact you used the most on this quiz.
- Circle facts you "just knew." Highlight those for which you used a strategy.
- Circle facts you are sure about. Draw a square around facts that took you longer to solve.

Meaningful fact assessment for teachers and students

We recognize that using timed tests is a deeply rooted practice for measuring basic fact mastery. We hope that we have effectively made a case for why this practice must change and how to make such a change. As the NCTM Assessment Principle states, "Assessment should support the learning of important mathematics and furnish useful information to both teachers and students" (NCTM 2000, p. 11). Using the range of assessments described above accomplishes these goals, as they provide an opportunity for meaningful, targeted feedback to students that far exceeds the "right or wrong, fast or slow" feedback provided by timed testing. In fact, these assessments infuse a fth and critical category of assessment: self-assessment. Interviews, journals, and quizzes on basic facts can and should encourage students to re ect on which facts and strategies they know well and which ones are tough for them. This self-assessment can be effectively followed up by having children identify and record strategies that could be used to ef ciently determine the "tough" facts in the future. Over time, this self-assessment practice encourages children to instinctively apply effective strategies for challenging facts they encounter. As both teachers and students critique their growth with use of appropriate strategies, ef ciency, exibility, and accuracy, then true uency with basic facts can become a reality for every child.

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