

PART I

GETTING STARTED

““ When I first heard about assessment, I just figured they were talking about our end-of-year state-required tests. ””

—FIFTH-GRADE TEACHER

““ Why didn't I learn about formative assessment in my teacher prep program? ””

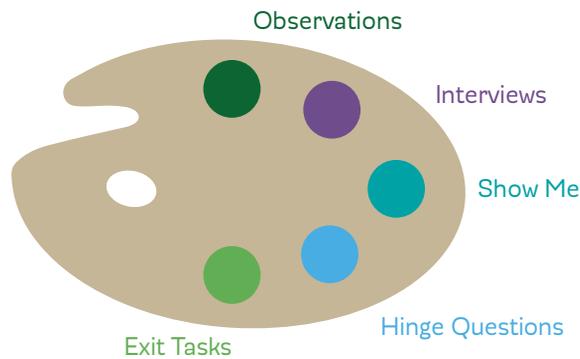
—FIRST-YEAR TEACHER

““ I just figured I could search online and buy whatever formative assessment I needed for math. ””

—MIDDLE SCHOOL TEACHER

WHY FORMATIVE ASSESSMENT?

ISSUES AND OPPORTUNITIES



Assessment Literacy: What Is It? Why Is This Important?

Assessment of student learning is the responsibility of every school district, every school, and every teacher. In a report prepared for the Council for the Accreditation of Educator Preparation, Kahl, Hofman, and Bryant (2012) found that in many preservice teacher education programs, attention to assessment literacy was incomplete, rendering many, if not most, beginning teachers unprepared for the actual use and interpretation of assessments. Major tenets of assessment literacy include being able to create, select, and effectively use classroom assessments and being able to select and effectively interpret and use results from external summative assessments.

Included among the understandings and skills that encompass assessment literacy are teacher expectations related to the identification, selection, or creation of assessments designed for monitoring student growth and the diagnosis of specific student needs, which is essentially what this book is all about—formative assessment. Important issues related to analyzing and evaluating the evidence generated by summative assessment is really important

too, but that's perhaps another book for another time. Our focus will be on assessment literacy as it relates, every day, to the classroom—YOUR classroom. Consider this chapter as the beginning of a journey that will start with an overview of particular issues and challenges related to assessment and then move to address, more directly, the classroom-based formative assessment techniques that are the focus of this book, and that you will use every day.

Formative/Summative: It's All Testing, Right?

“ I actually never knew that my end-of-year and end-of-marking period benchmark tests in mathematics were summative assessments. Thinking about how I can use both formative and summative assessments has been an eye-opening experience to me, AND I'm in my fifth year of teaching! ”

—FOURTH-GRADE TEACHER

Assessment at the PreK–12 level has long been an assumed responsibility of the classroom teacher. You assess to compare students, guide and influence instruction, and evaluate (e.g., evaluating a curricular program or instructional technique). Think about each of these purposes. When are you assessing to compare? To influence instruction? To evaluate? And, importantly, how much instructional time are you and your school district devoting to assessment? How are you using the assessment results—both assessments that you create and use and those external summative assessments that you are responsible for administering (e.g., school district, state, or other mandated assessments)? Some argue, perhaps appropriately, that external summative tests are taking way too much time away from teaching and learning. For example, in *Testing More, Teaching Less* (Nelson, 2013), it was revealed that in one school district studied, students spent up to fifty-five hours per year taking tests. (That's about two full weeks of the school year.) One of the school districts studied had twelve different district and external summative assessments that accounted for forty-seven separate administrations of these assessments over the course of one instructional year.

As a classroom teacher, your day-to-day involvement with assessment should be in the consideration and use of classroom-based formative assessments, while acknowledging the role and potential of summative assessment. Let's start this by considering, and even defining, both formative and summative assessment.

Formative assessment has been discussed and seemingly defined and redefined for more than fifty years. Scriven (1967) and Bloom (1969) were early advocates of the power of formative evaluation to improve instruction. Based on their review of hundreds of studies, of which 250 were directly relevant to formative assessment, Black and Wiliam (1998) defined formative assessment “as encompassing all those activities undertaken by teachers and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged” (p. 7). Formative assessment includes all activities that provide information to be used as feedback to modify teaching and learning. Our focus is on the everyday use of classroom-based formative assessments to monitor, probe, and provide feedback designed to impact planning and teaching.

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Summative assessments are typically used to assess student learning at the end of an experience. This could be a unit assessment, school district assessment, or the more high-stakes and high-profile end-of-year state assessments. Many summative assessments are externally created, that is, prepared by others. Summative assessments are typically used to compare. Such comparisons could be student-to-student or class-to-class, or the extent to which results address predetermined standards or expectations. Summative assessments are regularly used to identify score-based differences among individual students or among groups of students. These comparisons often lead to classifications of student scores on a student-by-student basis or on a group-by-group basis, using norms or defined levels of performance (e.g., advanced, proficient, developing, not yet met). Summative assessment results or even performance on particular items can be used formatively when grade-level teams analyze results and use them to guide instructional goals and classroom activities. The Every Student Succeeds Act, signed by President Barack Obama in December 2015, requires that all students complete a state-determined summative assessment in Grades 3–8 and once at the high school level. However, states now have flexibility in how and when they administer the tests (e.g., a single annual assessment can be broken down into a series of smaller tests). There’s also an emphasis on finding different kinds of summative tests that more accurately measure what students are learning. To summarize the differences, many characterize summative assessments as assessments *of* learning and formative assessments as assessments *for* learning.

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This book addresses a specific need with regard to formative assessment, which is to identify and provide specific suggestions on how to use particular classroom-based formative assessment techniques on a regular—daily—basis. Our book is not about

high-stakes summative assessments and the perceived, by many, overuse of such assessments. What we offer is designed to connect planning, teaching, and assessment in YOUR classroom every day.

Formative Assessment: Assessing to Inform

“ I never ‘got’ formative assessment. It just seemed to be like try this and try that. So many things to consider. Then I had this professor and he used the painter’s palette analogy. Small number of paints to choose from, which could be mixed and applied using various techniques and used daily. Bingo. Got it. And now I use these classroom-based formative assessment techniques every day. ”

—MATH SPECIALIST/INSTRUCTIONAL LEADER

Black and Wiliam (2009) noted that assessment becomes formative “to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction” (p. 9). As stated previously, we know that formative assessment has been defined, redefined, researched, and discussed for decades. *Education Week* (“Understanding formative assessment,” 2015) noted that formative assessment is both widely used and poorly understood! Some argue that the phrase *formative assessment* is open to too many interpretations. Stiggins (2005) and others actually prefer the phrase *assessment for learning*. Our position is that formative assessment is an integral component of what you do every day—planning and teaching—and that it involves a carefully defined and vetted set of assessment techniques specifically designed to *inform* instruction.

As a teacher, you are involved every single day in planning and teaching and then repeating that process. Assessment is integral to both planning and teaching. Linda Darling-Hammond (1994) noted that “in order for assessment to support student learning, it must include teachers in all stages of the process and be embedded in curriculum and teaching activities” (p. 25).

Directly connecting assessment to planning and teaching within each lesson provides both the foundation and consistency in approach to truly influence teaching and learning. So, for instance, as you plan, consider not only mathematics content (e.g., place value) but also how the Standards for Mathematical Practice (National Governors Association Center for Best Practices and

Directly connecting assessment to planning and teaching within each lesson can truly influence teaching and learning.

Council of Chief State School Officers [NGA Center & CCSSO], 2010) will be integrally involved within a lesson. Linking assessment to planning *informs* both teaching and learning (*form* within *inform* is italicized to bring attention to the central role of classroom-based formative assessment as it *informs* teaching and learning).

William and Thompson (2007) suggest that the effective use of assessment for learning consists of five key strategies:

1. Clarifying and sharing learning intentions and criteria for success with learners:

Paige cut three pieces of rope, and each piece was $1\frac{1}{2}$ meters long. She placed the rope pieces end-to-end. She thought she had > 5 meters of rope. Was she right? Can you show me how you decided if Paige was right or wrong?

The focus here is on your unpacking of the intended learning goals of a lesson and then determining the mathematical tasks and related activities that will lead to the expected learning. The example of the problem involving Paige above provides a beginning task in multiplying whole numbers and fractions. The Show Me response requested (this formative assessment technique is the focus of Chapter 3) should demonstrate a level of understanding related to the mathematical intent of the lesson.

2. Engineering effective classroom discussions, questions, and learning tasks that elicit evidence of students' learning:

Using a rectangular region, show me three ways to represent fractions equivalent to $\frac{1}{4}$.

If we doubled the length of each side of a square, what happens to the area of the square?

This assessment strategy considers how you will develop classroom activities that not only engage students in doing mathematics, but provide evidence of student progress toward intended mathematics goals. The emphasis here is on finding the time to plan for each lesson with consideration for what and how you will assess student progress. Think about what you would assess for each of the examples above. Careful planning—including attention to questioning, particularly the lesson's hinge question (more on that later)—and engineering the discussion of learning tasks address assessment *for* learning rather than *of* learning.

3. Providing feedback that moves learners forward:

Great job! All five answers are correct.

You solved the first three correctly. Look at problems 4 and 5 and see if you can find your error, and then show me how you would do these problems differently.

You provide feedback to your students every day. However, the most important thing about feedback is what students do with it. If your feedback prompted students to try a different solution strategy and they do so, then the feedback was helpful. Perhaps your feedback just affirms a student's response like the first example above. Whether or not specific feedback to your students "works" is really something that you can control. The more you observe your students as they engage in learning mathematics, the more you will get to know them and provide personalized feedback when they need it. In the second boxed example above, you may want to linger with the student so that the Show Me response can be quickly reviewed and additional feedback provided as needed.

4. Activating students as owners of their own learning:

I like that pattern. Can you provide the next three numbers in the pattern and, as you do that, tell me why you have included them?

Show me how you know that multiples are different from factors.

One intent of formative assessment is help students, all students, take an active role in and ownership of their learning.

Using formative assessment to monitor teaching and learning is not a one-way, teacher-to-student trip. The intent is to engage students in learning mathematics, which includes students taking an active role as they monitor and guide their own learning. One intent of formative assessment is to help students, all students, take an active role in and ownership of their learning. Such inclusive ownership and self-assessment opportunities will impact the pace of particular lessons and also have you consider particular formative assessment techniques. Your use of observation, interviews, Show Me, hinge questions, and exit tasks, the classroom-based formative assessment techniques presented in this book, will include the consideration of students as respondents, active learners, and fully engaged self-assessors.

5. Activating students as instructional resources for one another:

Teacher: Work that problem out with your partner and be prepared to share the solution with the class.

Cam: When I looked at how Quinn solved the problem, I really liked what he did. Next time I might try thinking about percent his way—rather than finding what you pay if it's 25 percent off, which is a two-step problem, thinking about the problem as 75 percent on (just subtracting 25 percent off mentally) turns it into just a “one-stepper.” I like that.

Paired learning and small group learning activities are instructional strategies you have most likely used throughout your teaching career. The formative assessment potential of peer review is in developing responsible collaboration among students. The result is that students learn from each other. Perhaps more importantly, students are often more willing to accept feedback from a peer than an authority figure (e.g., teacher, parent . . .) even when such student-to-student feedback is generally concisely presented and often very direct (e.g., “Why would you do it that way?” “No way that answer is even close.”).

What we know about formative assessment is that student achievement can be improved when teachers regularly use it both within and between lessons. Our approach to classroom-based formative assessment has been to focus on what Wiliam and Thompson (2007) have defined as short-cycle formative assessment—day by day and minute by minute. Our experience has been that such assessment is integral to and within every lesson, with the potential to impact students between lessons as well. While we recognize the importance of all of the key strategies discussed above, our approach particularly emphasizes and promotes the following two strategies:

Engineering effective classroom discussions, questions, and learning tasks that elicit evidence of students' learning

Providing feedback that moves learners forward

The everyday use and related student responses and feedback to the formative assessment techniques presented here are intended to guide and *inform* your everyday planning and instruction.

Classroom-Based Formative Assessment: Why Is This Important? You Do Have the Time to Do This!

“ It took me years to realize that assessment, particularly what I do in the area of classroom assessment, isn’t some stand-alone ‘other thing’ I am supposed to be doing as required by my school’s supervisor. Hello, why didn’t anyone tell me?! ”

—FOURTH-GRADE TEACHER

“ Formative assessment? I just thought it was something I was required to do. ”

—KINDERGARTEN TEACHER

When you create, select, administer, and then evaluate the results of *any* assessment, formative or summative, you estimate the value of the responses and use that to determine what students know. Important stuff. By November of any given instructional year, you have a sense of what each student in your mathematics classroom knows and is able to do. But the reality is, much of what you do assessment-wise is, or should be, directly related to what you teach—every single day. That’s how we envision formative assessment. As noted earlier, the focus of this book is classroom-based formative assessment—the use of particular assessment techniques that you can and should use every day to not only validate and build on prior assessments, but also guide your planning and teaching. Why? Consider NCTM’s *Principles to Actions* (2014): “An excellent mathematics program ensures that assessment is an integral part of instruction, provides evidence of proficiency with important mathematics content and practices, includes a variety of strategies and data sources, and informs feedback to students, instructional decisions and program improvement” (p. 89). The point here is that assessment must be an everyday component of what you do as you plan and teach. Assessing while you teach—it’s what you do. You plan and teach, and as you teach a lesson, any lesson, you can—and should—use particular assessment techniques to monitor student progress within the lesson, as well as the lesson itself.

Assessing while you teach—it’s what you do.

In our early work with formative assessment, we recognized—and mathematics specialists and teachers told us—that there were so many suggestions and ideas related to formative assessment that

understanding and using them was never well understood. And, in some cases, all of the hype regarding formative assessment put the specialists and teachers on overload. This got our attention. We have spent time distilling and validating, through classroom use, a small set of classroom-based formative assessment techniques that teachers have used successfully on a regular basis. We like to think of these classroom-based formative assessment techniques metaphorically as a palette of five “colors” that you can use as you paint your own classroom canvas, sometimes mixing the colors to find the best way to formatively assess and guide teaching and learning on a daily basis. Later in this chapter, and much more specifically and in depth in the chapters that follow, we will discuss the five techniques, which we call the Formative 5—observations, interviews, Show Me, hinge questions, and exit tasks.

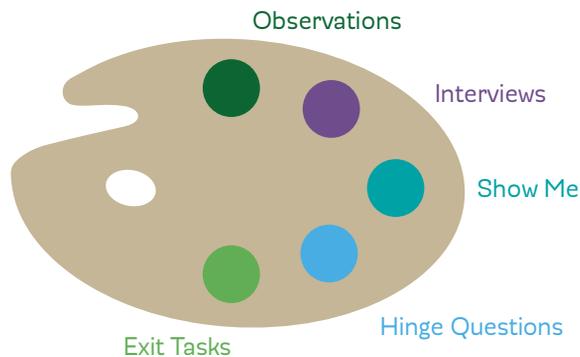
Let’s think about formative assessment as it links to your own daily and even long-term planning for instruction. As you plan, you consider the mathematical focus of the lesson. An important prerequisite to such planning is your own understanding of the mathematical content and pedagogical knowledge related to your grade level and beyond. We fully recognize that it takes time for you to understand the learning trajectories of the mathematics content topics for which you are responsible, as well as how to interpret and address them in your classroom. For example, for a lesson at the fourth-grade level related to equivalent fractions, some of your students may be able to move quickly into extensions involving comparing and ordering fractions, while others may have difficulty representing common equivalent fractions. As you know, such a range within a single mathematics topic is not uncommon. However, your ability to plan based on knowledge of your students and their mathematical needs is important. This certainly includes particular tasks you may select and design to match your lesson’s mathematical focus, and, importantly, how you will assess student performance and the overall impact and effectiveness of your lesson. In short, as you plan, you should anticipate what you expect your students to accomplish. So, yes, what and how you will assess is part of both planning and teaching. Your teaching will reflect the formative assessment techniques you had planned to use to monitor student progress and the lesson’s overall effectiveness. The following questions may help guide your planning and teaching as related to your use of formative assessment:

- What tasks and questions will be used to engage students in the lesson?
- How will learning trajectories of the mathematics content focus of the lesson be considered to ensure the developmental appropriateness and student prerequisite background for this lesson?

- How will you communicate student learning expectations for this lesson?
- When and how will students receive feedback for their contributions during the lesson?
- What responsibilities do your students have for assessing their learning in this lesson?
- How will formative assessment be used to monitor student progress in this lesson?
- Will students be assessed individually, in groups, or both individually and within a group?
- How will formative assessment be used to determine the effectiveness of the lesson?

Now let's consider the specific classroom-based formative assessment techniques that you can use in your classroom.

Formative Assessment in YOUR Classroom: The Classroom Is *Your* Canvas!



“ I actually never thought much about using formative assessment every day and had no idea how it connected with my planning and teaching. So glad we decided to use observation, interviews, Show Me, hinge questions, and exit tasks regularly. I get it now, and my kids have actually come to expect the hinge question and exit tasks. ”

—THIRD-GRADE TEACHER

As noted earlier, this book presents five classroom-based formative assessment techniques, the Formative 5, which you can use every

day. Using the metaphor of an artist's palette of five colors, the assessment techniques can be ordered and mixed based on your planning and instructional needs. The chapters that follow will present, discuss, and provide tools for using the Formative 5 techniques—observations, interviews, Show Me, hinge questions, and exit tasks—in your classroom. This palette of formative assessment techniques has been gleaned from the seemingly endless suggestions provided for classroom consideration and use and have been carefully defined and tested in classrooms. A brief summary of each of the Formative 5 techniques is provided below.

The palette of formative assessment techniques can be ordered and mixed based on your planning and instructional needs.

Observations. You observe your students every day—throughout the day. While this technique may be the most informal classroom-based formative assessment, its use is of particular importance to you as you monitor a lesson. As you use observation as a classroom-based formative assessment technique, the following questions, which will be discussed in depth in Chapter 1, will be helpful as you plan for the use of this technique.

1. What would you hope to observe your students doing in this mathematics lesson?
2. How would you know “it” if you saw it?
3. Are there particular challenges or difficulties you may observe (conceptual or procedural)?
4. What misconceptions might you observe?
5. How might you record/note what you observe?

A major intent of the observations chapter (Chapter 1) is to provide the background and support tools that should assist you in using observation as a formative assessment technique to guide and *inform* your planning and teaching and monitor student progress.

Interviews. An interview extends an observation. These two techniques are almost always connected. The interview provides the obvious follow-up to an observation a teacher might make when implementing a lesson. An interview also allows the teacher to spend a few valuable minutes digging deeper with an individual student or perhaps a small group of students. The goal of the interview is to get a glimpse of what a student is thinking. A full discussion of the interview technique, including helpful interview tools, is provided in Chapter 2. The questions below, also presented in Chapter 2, should help guide your use of the interview technique.

1. What would make you decide to work with a student one-on-one or with a small group of students?
2. What interview questions might you ask? How might the questions be different for particular students?

3. What will you anticipate from students response-wise? (Consider both understandings *and* possible misconceptions.)
4. What follow-up interview questions might you ask?

The Interviews chapter will provide you with the background and tools appropriate to conduct, analyze, and use interviews to both monitor student progress and guide your planning and teaching.

Show Me. Show Me is a performance-based response by a student and, like the interview, extends an observation. Show Me occurs when a student, pair of students, small group, or perhaps the entire class might be asked to show how something works, how a problem was solved, how a particular manipulative material or related representation was used, and so on. Teachers and mathematics leaders who have used the Show Me technique have noted that it validated information gathered from an observation and/or interview and often provided the first step in redirecting student responses. The following questions have proven to be helpful when anticipating use of the Show Me technique.

1. How is your Show Me different from an observation and interview?
2. What will you use as a prompt for a Show Me request for this lesson?
3. What might you want a student or students to show and say as they describe their Show Me response?

Chapter 3, the Show Me chapter, provides a full discussion and includes a variety of related tools useful for presenting and using the Show Me technique. The observation-interview-Show Me techniques are all quite connected. You will use each of them every day, with the observation typically, but not always, helping to define the specifics of the interview and Show Me opportunities.

Hinge Question. The hinge question (Wiliam, 2011) provides a check for understanding/proficiency at a “hinge point” in a lesson. The hinge question is a question that you plan for and use to elicit responses indicating your next step planning-wise and instructionally, with particular implications for the next day’s lesson. Responses to the hinge question directly *inform* both planning and instruction.

Creating the hinge question is an important part of the planning of the day’s lesson. Our experience has been that teachers need to take the time to create a question that truly assesses the major focus of the day’s lesson. We often consider the hinge question as the lesson’s “deal-breaker” since responses help you to determine

your next steps instructionally. We have also found it helpful to actually try out hinge questions with colleagues within a grade-level professional learning community. Such trial opportunities also provide teachers with occasions to consider varied hinge question formats. Most importantly, your ability to engineer the use of the hinge question is critical. Considering how you will engage students, assess responses, provide feedback, and decide instructional next steps attests to both the value and importance of the hinge question. Suggestions for the use and types of hinge questions are presented in Chapter 4. This will be a particularly important chapter for you.

Exit Tasks. The National Council of Teachers of Mathematics' *Principles to Actions* (NCTM, 2014) emphasizes the importance of using tasks to elicit student learning and then using the resulting analysis to inform instruction. We consider exit tasks as end-of-lesson formative assessments. We deliberately define such assessments as exit tasks given our experience with the seemingly increasingly popular use of exit tickets or exit slips. The exit task is designed to provide a capstone problem/task that captures the major focus of the mathematics lesson for that day or perhaps the past several days. The use of such problem-based tasks is quite different from the exit tickets or exit slips we have reviewed that tend to address particular mathematical procedures or provide opportunities for students to rate their level of understanding on the mathematics topic of the day. The exit task is actually a product, providing actual work samples for you to review and use for future planning. Like the hinge question, planning time will be needed to develop the exit task, and such task development is enhanced when school or grade-level teacher learning communities work together in their creation, use, and revision. Questions to consider in exit task development include, but are not limited to, the following:

1. Does the exit task capture the mathematics content expectations of your lesson?
2. Given the grade level, classroom norms, and prior experience working with challenging mathematical tasks, will this exit task engage your students?
3. Should the exit task be completed by individual students, student pairs, or small groups?
4. When will you be able to review exit task responses and use the responses to guide your planning as well as provide feedback to your students?

The exit task chapter (Chapter 5) includes multiple examples of exit tasks and tools guiding their use. Given the performance and product nature of the exit task, it is not likely that you would use

the exit task every day. Our experience has been that teachers use exit tasks two to three days per week and that the student responses guide not only daily but longer term planning.

Summing Up

Consider the title of this section: Why Formative Assessment? Issues and Opportunities. Even without thinking about it, you assess student progress all day long, every day. You observe, you talk to your students about what they are learning, you ask students to show you what they are doing, you ask questions, and so much more. The chapter started by discussing the importance of assessment literacy, and we recognize that such understanding is the foundation to truly recognizing the importance of both formative and summative assessment and how, in particular, formative assessment can and must guide and monitor your teaching every single day. That's what this chapter and the following chapters are all about—understanding the opportunities related to classroom-based formative assessment and considering how you can make a difference as you connect your planning and teaching to particular classroom-based formative assessment techniques—the Formative 5. This palette of formative assessment techniques—observations, interviews, Show Me, hinge questions, and exit tasks—was presented briefly in this chapter and will be thoroughly discussed and analyzed, with lots of tools supporting its use, in subsequent chapters. The Formative 5 techniques represent our response to addressing issues and opportunities related to formative assessment. Let's get started.

Professional Learning Discussion Questions

Read and discuss the following questions with your grade-level teaching team or with teams across multiple grade levels. Take notes here or use the tools in the Book Study Guide to record your thoughts.

How does (or perhaps should) the use of formative assessment influence your instructional planning?

How much time do you spend each day as you assess student progress in mathematics?

How much time do you spend each month and during the entire school year assessing your students? Make sure to include the summative assessments you administer as well as the formative assessments you may provide.

In your own words, describe the differences between formative and summative assessments.

What formative assessment techniques are you currently using?

What concerns you the most about your use of formative assessment every day?

What concerns you the most about the imbalance, particularly as emphasized in reporting to parents and in the media, between formative and summative assessment?

How do you provide feedback to your students with regard to the assessments that you use?

Is there a difference in how assessment feedback is provided based on the developmental level of students? Does the mathematics content being assessed impact how you provide feedback on such assessments?