CHAPTER 1

OBSERVATIONS

Observations: Background and Basics

As you consider classroom-based formative assessments, the observation is your "first stop" in the everyday application of the Formative 5. By **observation**, we mean directly observing student and class progress on particular mathematics activities. Observing is what you do every day, all day long. You watch, you notice, but the intent here is to consider how you will use observations, every day, as a formative assessment technique that is closely aligned to your planning and teaching. In our development and use of this book's palette of formative assessment techniques, we have found that the observation, while perhaps the most informal and readily used of the five formative assessment techniques presented (Chapters 1–5), is both taken for granted and, at least to an extent, the least understood of the five techniques.

Observation is directly observing student and class progress on particular mathematics activities.

A quick look at research involving the use of observation includes decades of support for its use. Note that years ago, Freudenthal (1973) indicated that "we know it is more informative to observe a student during a mathematical activity than to grade his papers" (p. 84). More recently, observation-like research related to noticing (Jacobs, Lamb, & Philipp, 2010) has documented how teachers notice children's mathematical thinking. In other words, what has been documented supports the seemingly obvious importance of paying attention to what you see in the classroom and suggests that you spend time anticipating what you might notice or observe, which is what this chapter is all about. **Professional noticing** is "a set of interrelated skills which include (a) attending to children's strategies, (b) interpreting children's understandings, and (c) deciding how to respond on the basis of children's understandings" (Jacobs et al., 2010, p. 172).

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Planning for Observations

Let's begin to think about your own planning and the use of observation as a formative assessment technique. The first step in your daily planning, of course, is determining the mathematical focus of a lesson and how your students will be engaged in the mathematics they are learning. Along with such mathematical and instructional intentions should be the consideration of how you will

use observation. The following questions should help you as you anticipate how you will connect observation to the planning process.

- What will you look for as you observe your students engaging in mathematics?
- How will you use what you observe to monitor the pace and sequence of the day's lesson?
- What can you take away from what you have observed to help in planning for the next day?
- How might you provide feedback to your students, assess what you observe, and record progress?

These anticipatory questions should help you in truly connecting planning to this classroom-based formative assessment technique. Eric's narrative below is fairly typical of early connections with planning and the use of assessment.

> "I've been teaching for eight years, and I never thought much about formative assessment. It seemed vague—so many ideas about what it was and how I should be using it—but I was never really plugged into why and the actual specifics of how to use it. So, over the last year or so as we have been using what we call the 'Formative 5,' when I sit down after school or at night and actually plan my lesson, I have gotten to the point where I anticipate what I might observe in my lesson and think hard about what it might look like. Then, pretty important here, I think about what I might do with what I observe—whether that's moving to another of the Formative 5 or considering feedback with my students or thinking about what I have just observed and how it will impact my planning for the next day. This has all become pretty routine now, but I admit that I could have always done this, I just never realized the power and importance of observing."

Eric's growth in understanding the value of observation and using this technique helped in the development of the guiding questions for daily use of observation, and its connection to your planning and teaching (see Figure 1.1).

The questions in Figure 1.1 are intended to guide you as you consider whether and how you will use observations to monitor instruction and student learning. The following examples, at various grade levels, provide actual considerations for use of the guiding

Figure 1.1 • Planning for Observations

1. What would you expect to observe?

- As you plan a lesson, anticipate what you would expect students to be doing as they engage in the mathematics focus of the day's lesson.

2. How would you know "it" if you saw it?

- As you plan and then think about teaching a lesson, how would you know if what you expected to observe actually occurred?
- This consideration sharpens the first question and extends it from what you anticipate or expect to the actual reality of considering responses—and that's assessment.

3. What mathematical challenges or misconceptions might you observe?

- As you get ready to finalize how and what you will observe within a lesson, it just makes sense to reflect on your experience in teaching mathematics.
- What are the "bumps" in your lesson that you may want to especially look for or observe?
- Are such "bumps" related to conceptual understandings, procedures, the use of representations, use of specific mathematics vocabulary, being able to write a response to a problem's solution, or something else?

4. How might you record and provide feedback of what you observed?

- What tools would you use and how frequently would you use them to more formally monitor what you observe?
- In particular, see the Tools for Using Observations in the Classroom section of this chapter for examples of individual student, small group, and classroom observation tools.
- As you observe your students engaged in the mathematics they are learning, will you provide oral feedback to students as they work, or will you use the tools provided in Figures 1.3, 1.4, or 1.6 to provide feedback at another time (perhaps at the end of the lesson or even the end of the day)?

questions, while the next section of the chapter presents actual tools (Figures 1.2 and 1.3) you can use to help guide your planning of the observation as well as monitor what may actually occur and what you might notice as the lesson is implemented.

Grade 1: Lesson focus is: counting to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. Consider the following as you plan such a lesson.

What would you expect to observe?

- Would you expect to see and hear students orally counting from a given number (e.g., orally counting from 71 to 120)?
- Would you expect to see students representing given numbers and a counting sequence using base-ten rods (e.g., represent 71 and count on using base-ten rods from that number)?
- Would you anticipate orally hearing a counting sequence long enough that you could determine that students could orally count to 120 or another designated number from a given starting point (e.g., start with 83 and count to 105)?
- **Your turn:** What else might you anticipate observing? And, given YOUR class, YOUR students, what might YOU expect to observe?

How would you know "it" if you saw it?

- You would see and hear students counting on from a given number.
- You would see appropriate use of base-ten materials as students counted on from a given number to an end number, perhaps 120.
- You would hear varied but appropriate counting sequences as you observed.
- **Your turn:** What other "its" might you see and/or hear?

What mathematical challenges or misconceptions might you observe?

- Students confused as to the "start number" (e.g., starting at zero rather than an identified start number)
- Students unable to write numbers
- Students challenged when counting orally and bridging from one decade to the next
- Students challenged when using representations (models) for two- or three-digit numbers
- **Others?** What particular misconceptions have you seen/experienced that may occur?

How might you record and provide feedback of what you observe?

- Consider the examples of the individual student, small group, and class observation tools found on pages 32–38. You can access these tools for your own use at **http://resources.corwin.com/Formative5.**
- Consider taking a picture of what you observe as a record of student performance.
- Consider an observed response that may require immediate oral (typically) feedback.
- Consider use of a brief comment from your records as feedback provided later in the day or at some other time—perhaps within a parent/teacher conference.

Grade 3: Lesson focus is: representing a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has the size $\frac{a}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line. Consider the following as you plan such a lesson.

What would you expect to observe?

- Would you expect to see students representing fractions on the number line by iterating the unit fraction (e.g., show $\frac{3}{4}$ by noting 3 lengths of $\frac{1}{4}$)?
- Would you expect to see students comfortable when creating and labeling unit fraction iterations on their number lines?
- Would you want to orally hear how students determined and plotted the location of fractions as requested?
- **Your turn:** What else might you hope to observe? And, given YOUR class, YOUR students, what might YOU expect to observe?

How would you know "it" if you saw it?

- You would see and hear students plotting particular fractions on their number lines based on the interval of the assigned fraction(s).
- You would see appropriate use of the number line as a representational tool and linear (measurement) model for fractions.
- **Your turn:** What other "its" might you see and/or hear?

What mathematical challenges or misconceptions might you observe?

- Students having difficulty plotting fractions on the number line by counting unit fractions
- Students lacking experience in the use of the number line as a representational tool
- **Others?** What particular misconceptions have you seen/experienced that may occur?

How might you record and provide feedback of what you observe?

- Consider the examples of the individual student, small group, and class observation tools found on pages 32–38. You can access these tools for your own use at **http://resources.corwin.com/Formative5.**
- Consider taking a picture of what you observe as a record of student performance.
- Consider an observed response that may require immediate oral (typically) feedback.
- Think about how you might provide feedback to your students using your responses to the Planning for Observations questions (Figure 1.1).

Grade 5: Lesson focus is: interpret division of a unit fraction by a nonzero whole number, and compute such quotients. Demonstrate by creating a word problem for $\frac{1}{2} \div 4 = \frac{1}{8}$ because $\frac{1}{8} \times 4 = \frac{1}{2}$, and representing the solution using a visual model. Consider the following as you plan such a lesson.

What would you expect to observe?

- Would you expect to see students working together, in small groups, as they create their word problems?
- Would you truly hope to see students creating a word problem that was not about pizza?
- Would you expect to see students using the number line or an area model to partition $\frac{1}{2}$ by 4 (dividing by 4)?
- Would you anticipate that students would recognize that $\frac{1}{2} \div 4 = \frac{1}{8}$ since $\frac{1}{8} \times 4$ or $\frac{4}{8} = \frac{1}{2}$?
- **Your turn:** What else might you expect to observe? And, given YOUR class, YOUR students, what might YOU expect to observe?

How would you know "it" if you saw it?

- You would see and hear students sharing word problems for $\frac{1}{2} \div 4 = \frac{1}{8}$, plotting particular fractions on their number lines based on the interval of the assigned fraction(s).
- In addition to an appropriate word problem, you would see students use manipulatives, an area model, or the number line to represent the problem and solution for $\frac{1}{2} \div 4 = \frac{1}{8}$ recognizing that $\frac{1}{2} \div 4 = \frac{1}{8}$ can be thought of as $4 \times \frac{1}{8} = \frac{1}{2}$.
- **Your turn:** What other "its" might you see and/or hear?

What mathematical challenges or misconceptions might you observe?

- Students having difficulty framing word problem contexts for $\frac{1}{2} \div 4 = \frac{1}{8}$
- Students unable to recognize the relationship between $\frac{1}{2} \div 4 = \frac{1}{8}$ and $\frac{1}{8} \times 4 = \frac{1}{2}$
- Students having limited experience using representations for division of fraction problems
- Students more comfortable using area models than the number line for representing division of fraction problems
- **Others?** What particular misconceptions have you seen/experienced that may occur?

How might you record and provide feedback of what you observe?

- Consider the examples of the individual student, small group, and class observation tools found on pages 32–38. You can access these tools for your own use at **http://resources.corwin.com/Formative5.**
- Consider taking a picture of what you observe as a record of student performance.
- Consider an observed response that may require immediate oral (typically) feedback.
- Think about how you might provide feedback to your students using your responses to the Planning for Observations questions (Figure 1.1).

Grade 7: Lesson focus is: decide whether two quantities are in a proportional relationship. Test for equivalent ratios by using a ratio

table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. Consider the following as you plan such a lesson.

What would you expect to observe?

- Would you hope to see that students recognize how earlier understandings related to fraction equivalence is related to determining proportional relationships?
- Would you expect to see students comfortably using ratio tables to represent and help create equal ratios/proportions?
- Would you expect to see students using coordinate graphs to represent and then define proportional relationships?
- **Your turn:** What else might you hope to observe? And, given YOUR class, YOUR students, what might YOU expect to observe?

How would you know "it" if you saw it?

- You would see students using ratio tables to create proportions.
- Students would accurately describe how they created or validated proportional relationships using the ratio table and/or the coordinate plane.
- **Your turn:** What other "its" might you see and/or hear?

What mathematical challenges or misconceptions might you observe?

- Students having difficulty connecting equivalent fraction understandings to proportional relationships
- Students not being comfortable in their use of the ratio table or coordinate plane
- Students not understanding how to create and recognize proportional relationships
- **Others?** What particular misconceptions have you seen/experienced that may occur?

How might you record and provide feedback of what you observe?

- Consider the examples of the individual student, small group, and class observation tools found on pages 32–38. You can access these tools for your own use at **http://resources.corwin.com/Formative5.**

- Consider taking a picture of what you observe as a record of student performance.
- Consider an observed response that may require immediate oral (typically) feedback.
- Think about how you might provide feedback to your students using your responses to the Planning for Observations questions (Figure 1.1).

The grade-level examples above are all somewhat related in that they demonstrate how you might consider use of the questions provided in Figure 1.1 as you plan for using observation within a particular lesson. Note that the particular considerations for an observation with regard to what you expect to observe, how you would know "it" if you saw it, and anticipated mathematical challenges or misconceptions will vary with the content focus of the lesson and the prior knowledge of your students.

Tools for Using Observations in the Classroom

The tools provided in this section of the chapter should assist you as you plan for and regularly use observation as a formative assessment technique. The tools are related to planning for using observation, and monitoring small group, class, and individual student observations, and presented accordingly. Figure 1.2 will assist in your planning. This tool is useful for responding to the questions provided in the previous section of this chapter regarding your observation expectations. An example of how this tool can be used is provided using the Grade 5 lesson example discussed previously. You may access a blank version of this tool at **http://resources.corwin.com/Formative5.**

Figure 1.3 is a tool that was derived from our ongoing work and collaboration with school and classroom-based mathematics leaders, who have found that it is most helpful as a recording tool that can be used to make note of what's observed. It is also helpful for documentation of student responses, which can then be accessed for providing feedback to a small group of students, although this tool could also be used to record observation of individual students. Figure 1.3 is an actual example of how the Implementation and Recording Tool can be used. You can decide to carry this around and just jot down comments about what you observe, as some do, or at the end of the day, you can reflect on what you observed. Either way, this tool provides a record of you monitoring whatever

Figure 1.2 • Planning: Observations Template

Mathematics Standard: Grade 5: Division of a unit fraction by a whole number			
Lesson Objective: Interpret division of a unit fraction by a nonzero whole number, and compute such quotients.			
 **What would you expect to observe?**	 **How would you know "it" if you saw it?**	 **What mathematical challenges or misconceptions might you observe?**	 **How might you record and provide feedback of what you observe?**
Students solving the following problem using drawings: Edgar had $\frac{1}{2}$ of an apple pie. It was shared by 4 people. How much pie did each person have to eat? Use drawings to show your solution.	I would expect to see a circular or rectangular region showing $\frac{1}{2}$ then cut or shared by 4, with each slice labeled $\frac{1}{8}$.	I know some of my students struggle with drawing representations when doing operations with fractions.	I may take a picture of several problem solutions and have the students show and discuss them with the class.

Images: Clipart.com

A blank template version of this figure is available for download at **http://resources.corwin.com/Formative5**

elements of your lesson you want to document. Some teachers may use this tool for comments about the class as a whole, but we have observed that most like to use it for observing a particular small group of students or individual students. You can download this tool at **http://resources.corwin.com/Formative5.**

Figure 1.4 is a tool that allows you to keep an observation record for all students individually. It does not provide the opportunity to describe what you have observed in depth like Figure 1.3, but it does allow for a brief comment and—perhaps more importantly—provides you with a quick way to monitor all of your students.

Figure 1.3 • Small Group: Implementation and Recording Tool for Observations

Intent of the Observation	Brief Description/ Comments	Observed?
Mathematics Content	Students (4 of 5) successfully representing equivalent fractions on the number line; one student in this group really struggling.	Yes, for 4 of 5 students; I need to set up an interview with one student.
Mathematical Practices	Reasoning, using tools	Yes, but several of the students seemed just a little unsure about getting started with the number lines.
Student Engagement	Using the number line, a small group of 5 students were to represent 4 fractions equivalent to $\frac{1}{2}$ and discuss how they represented the equivalent fractions.	I think I may need to spend a little more time tomorrow discussing their reasoning for placing the fractions on the number line and equivalence, in general.
General Comment: Overall, this group seemed to do pretty well with this activity. I need to work more directly with one student who seems lost. I also need to help the group, maybe even my whole class, on just constructing number lines.		
Feedback to Students: I will be interviewing one of the students and then talking briefly to the other 4 as a group. I quickly checked each of the student number lines and asked for a validation of what they did and why—pleased with their response, particularly for a second lesson involving equivalent fractions.		

Source: Fennell, F., Kobett, B., & Wray, J. (2015). Classroom-based formative assessments: Guiding teaching and learning. In C. Suurtamm (Ed.) & A. McDuffie (Series Ed.), *Annual perspectives in mathematics education: Assessment to enhance teaching and learning* (pp. 51–62). Reston, VA: National Council of Teachers of Mathematics. Republished with permission of the National Council of Teachers of Mathematics; permission conveyed through Copyright Clearance Center, Inc.

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It can be used for one day; several days, as noted below; or the entire week. Note that the comments on the observation checklist (Figure 1.4) are quick notes. The advantage to this tool is that it's quite efficient to use, and it allows you to observe and record

Figure 1.4 • Classroom: Observation Checklist

Unit: Grade 4: Operations and Algebraic Thinking			**Date:** 2/7 to 2/10
Lesson Focus: Three days: Problem solving with whole numbers; factors and multiples; patterns			
Student Name	**Math Focus**	**Math Focus**	**Math Focus**
	2/7 Use the four operations with whole numbers to solve problems.	2/9 Gain familiarity with factors and multiples.	2/10 Generate and analyze patterns.
Anthony	On task, doing well	On task, slow start	He's got this—very pleased with himself.
Barbara	On task, struggling just a bit	Struggling; need to interview ASAP—today!	Interview coming up on this topic too, will need to do this tomorrow
Joe	Completed the task quickly; need to provide a more challenging follow-up example	Liked this, he's engaged. Today's tasks worked better than the previous lesson.	Doing fine
Angela	On task	On task	On task
Cynda	On task	For the most part on task	On task
Bryce	On task, but management issues within her group	Knows I'm watching, more focused than earlier	On task, management is no longer an issue
Matt	Doing well	Continues to do well	Has had a great day
Chris	Struggling	Need to interview and possibly do Show Me with him	May not get to this today
Mia	Need to work with individually ASAP	Did not start this activity—not ready	Will do this tomorrow
Janet	Disrupting progress of her group	Settled down, working pretty well in a paired activity	Doing fine
Add more rows as needed to accommodate all members of the class.			

A blank template version of this figure is available for download at **http://resources.corwin.com/Formative5**

comments about as many of the students in your class as you would like. Access this tool from **http://resources.corwin.com/Formative5** and adapt it to your needs.

The Classroom: Observation—Student Representations tool (Figure 1.5), which is adapted from the work of Smith and Stein (2011), is specifically focused on observing student use of varied representations, which is critically important in the development of understanding of major mathematics concepts in Grades K–8. This tool allows you to track anticipated and observed use of representations as well as who uses particular representations, also suggesting the order in which you may want students to share their representations and how they used them to solve problems. Finally, this classroom-based observation tool will provide you with information regarding student use and related understandings of

Figure 1.5 • Classroom: Observation—Student Representations

Student Representations (Anticipated/ Observed)	Who Is Using Specific Representations	Who I Will Select to Share Their Representations (order of presentations; 1st, 2nd, . . .)
Anticipated: Base ten block modeling		
Observed: Base ten block modeling	Ralph, Eric, Paige, Mia	1st–Mia; 2nd–Paige
Observed: Student pictures/drawings	Adrianna, Jazzmin, Katie, Heather, Bryce, Justin	3rd–Katie; 4th–Justin
Observed: Response to the task was accurate; representations were not used	Fran, Brett, Simone, Karen	5th–Simone; 6th–Brett
Observed: No representation provided, incorrect response to the problem	Timmy	This is important information. I will interview Timmy to assess his challenges with the task. For now, I will not have him share.

Source: Adapted from Smith, M. S., & Stein, M. K. (2011). *5 practices for orchestrating productive mathematics discussions*. Reston, VA: National Council of Teachers of Mathematics.

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varied representations, including manipulative materials, drawings, particular representations used with and for whole numbers as well as fraction representations, and so on.

The intent of the Individual Student: Mathematics Strengths Observation Log (Figure 1.6) is to document observations for individual students in greater depth. Note that this tool accounts for areas of a student's progress that includes mathematical disposition, how memory may play a part of a student's response, a student's attention to elements of the mathematics experienced, socioemotional elements of the learner, and organizational skills. You would use the Mathematics Strengths Observation Log in the following way:

- **Mathematics Concepts/Skills:** Record what you have observed mathematics-wise in the lesson or lessons recently observed.
- **Mathematical Disposition:** Note that the example response indicates how the student approaches the mathematics learning opportunities of the day.
- **Memory:** Discuss the extent to which the student's memory may have impacted responses. This will be more of a consideration for particular lessons (e.g., vocabulary, basic and related facts, mental mathematics).
- **Attention:** Consider the student's attention to the activities presented. Note the comment related to Maria's attention.
- **Socioemotional:** Address the student's ability and willingness to get along with others, persist in solving problems, and otherwise engage in the mathematics being presented.
- **Organizational:** Note how this element of the tool addresses how well the student is organized to attend to the demands of the mathematics activities central to the lesson.

As noted, you would consider this tool for an individual student you are closely observing, particularly a student for whom a more complete picture of progress may be needed. Our experience has been that many teachers like to use the Individual Student: Mathematics Strengths Observation Log in conjunction with or as an interview (Chapter 2). Some teachers also like to use this log to collect observed student strengths over time.

The Observation Check-In (Figure 1.7) is a tool that teachers with whom we work like to use for a quick "check-in" for individual students. Often placed on a tablet or 3 × 5 card, teachers can move around the classroom and just circle the extent to which individual

Figure 1.6 • Individual Student: Mathematics Strengths Observation Log

Mathematics Strengths Observation Log for: Maria, Grade 2				Date: 3/14	
Learner Profile					
Mathematics Concepts/ Skills	**Mathematical Disposition**	**Memory**	**Attention**	**Socioemotional**	**Organizational Skills**
List the student strengths with specific content, concepts, and skills.	*What types of content, tasks, and activities does the student respond to with positivity, interest, and engagement?*	*What kinds of things does the student remember?*	*What strengths does the student demonstrate?* *Does the student attend to particular types of activities?*	*How well does the student:* • *Work with others?* • *Productively struggle?* • *Persist?*	*How does the student organize/ record thinking for mathematics?*
Maria does well with activities involving counting and place value.	Maria seems interested in today's lesson and is generally interested in mathematics and almost always fully engaged. She does seem to get frustrated with problems involving the situations for addition and subtraction.	Memory is not a factor in today's lesson, but does seem to slow Maria up on math fact lessons. Maria seems to remember content best when connected to a real-world context.	Maria was focused for most of today's lesson, but she seemed to move a little too quickly through one of the lesson's final problems. Maria seems to attend best at the beginning of a lesson and during discussions and group work.	Maria was really engaged in the group task today. She led the group in recording responses.	Maria needed help getting organized in today's lesson. She organizes her work best when I help her set up a plan before she starts working.

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Figure 1.7 • Individual Student: Observation Check-In

Name: Roberto	Date: March 14
Mathematics Focus of the Lesson: Adding unit fractions	
Elements of the Lesson (Early, Mid, End)	**Productively Engaged**
Early: Using the number line to add unit fractions, with sums < 1	(Yes) No
Mid-Lesson: Discussion of student number line drawings	(Yes) No
End of the Lesson: Move to symbolically adding unit fractions	Yes (No)
Need for an interview?	(Yes) No
Comments: Roberto was engaged for most of the lesson and seemed to do well until we reached the examples where he was actually adding fractions (e.g., $\frac{1}{2}+\frac{1}{2}$). Will see how he does in tomorrow's lesson, which will continue with addition of unit fractions and move to subtraction of unit fractions. I think I will do a brief interview with Roberto toward the end of tomorrow's lesson.	

A blank template version of this figure is available for download at **http://resources.corwin.com/Formative5**

students or a small group of students is productively engaged in the lesson at various stages of the lesson: early, midway, and end of the lesson. You can also indicate if you would like to extend the observation to include an interview and provide comments related to what you have observed. This functional, easy-to-use tool indicates the extent to which your students are engaged in what you have planned, which is important for your planning the next day and beyond.

Consider the following questions and classroom-based responses as helpful suggestions on how you might use the tools presented in Figures 1.2–1.7.

1. **Lots of tools, just for observation here. I'm not expected to use all of these, all the time, right? I'm not even sure where to start!**

   Classroom-Based Response: *When I first began thinking hard about how to not just observe what my students were*

doing in mathematics class each day but also connect to my planning and begin to record what I had observed, Figure 1.2, Planning: Observations Template, became my new best friend! The questions on what I then called my planning tool (Figure 1.2) are pretty basic, and use of this tool really helped me get started in thinking about how to truly consider how and even when to use observation as an assessment technique.

2. **Which of these tools should I use and when?**

   Classroom-Based Response: *I had never recorded much of anything I observed my students doing in mathematics class! Boy, has the study and use of the Formative 5 changed my view. I was always grasping for comments at parent/teacher conferences or when I received calls from parents, and I seemingly never had actual "evidence" of what my students were doing or had done. The more I got into seriously reviewing and actually trying out the tools provided for observation, the more I realized that they were organized as small group (Figure 1.3), class (Figures 1.4 and 1.5), or individual student (Figures 1.6 and 1.7) observation tools. I started with the small group tool (Figure 1.3), since my independent work stations were organized by small groups. This tool worked well for me. Lately, I have been using the classroom observation tool, which focuses on the use of representations, since my work with fractions really emphasizes varied representations. This works well too and allows me to bounce between use of the small group tool, which I am now very comfortable with, and this whole class observation tool, which is focused on representations. I have also discovered that these tools are very valuable for parent conferences. They provide me with explicit data over time, which helps me explain student mathematical understandings to parents. They love it!*

3. **How much of what I observe should I actually record, and when?**

   Classroom-Based Response: *I have found that once I considered what I would observe as I planned my lesson, it was easier to determine which of the observation tools I would use, and that influenced how much I would record. In general, I would take notes on a tablet as I moved around the room. Sometimes I used the Classroom: Observation Checklist (Figure 1.4) for a full week, or at minimum several days, so I could see if there were tendencies being exhibited by particular students—having particular mathematical*

difficulties, not paying attention, and so on. Sometimes I would add more to my comments after mathematics class or at the end of the day. If I had particular concerns about what a student was doing, it almost always drove me to use one of the two individual student observation tools. Figure 1.6, Individual Student: Mathematics Strengths Observation Log, really examines a variety of learning dimensions that have always been helpful for me to document before I consider an interview for a student, and it requires more documentation than Figure 1.7, Individual Student: Observation Check-In, which is a quick response tool that essentially monitors student engagement at key points throughout the lesson. Not always, but often, what I have observed using the small group (Figure 1.3) or classroom tools (Figures 1.4 and 1.5) suggested the use of one of the two individual observation tools (Figures 1.6 and 1.7). After almost a year of truly using observation as a valued formative assessment technique, I know I am much more comfortable in deciding which observation tools to use, and when and how much to record, all of which provides me with suggestions for the feedback I can give to my students and particular next steps, which may be an interview.

Technology Tips and Tools for Recording Observations

In addition to the above, there are some digital tools that provide teachers with the means to capture student observations, each of which has specific advantages. As with any digital tool that is used to collect student data, be sure to investigate and follow school district data privacy policies and practices, and communicate the privacy plan and purpose of your recordings with parents/guardians and students:

- Virtually every digital handheld smartphone or tablet device comes equipped with a digital still image and video camera. The images and videos collected during your observations of students can allow both you and your students to document and review the following: student engagement with various mathematical practices, use of representations, mathematical arguments and reasoning, and preconceptions and/or misconceptions—all evidence of student learning. The digital files can be easily captured, stored, and used as powerful formative artifacts for students and teachers, and inform plans for next steps.

Having opportunities to pause, analyze, and re-experience an observation captured digitally, rather than relying on memory or written notes, can be extremely beneficial.

- Google Forms (http://www.google.com/forms) can be used to create your own classroom observation look-fors. This free and easy-to-use resource can be an effective and efficient way of capturing observation data and seamlessly accessing them in spreadsheet form for later analysis.

Using Observations in YOUR Classroom

When thinking about the use of observations to guide and monitor planning and instruction in YOUR classroom, consider the following:

When do I do this? When should I use observation? How do I use these tools in concert with one another? Expect to observe every day to inform your teaching and guide your planning. As noted in the previous section of this chapter, the observation tools provided in the chapter are potentially helpful to you initially as you plan for observing (Figure 1.2) and then as you consider observations with and for small groups of students (Figure 1.3), classroom observation (Figures 1.4 and 1.5), and observing individual students (Figures 1.6 and 1.7). The more you directly consider how and what you will observe and its importance in the planning, teaching, assessment cycle, the less you will have to think about it. What and how you observe, and use of the tools noted previously, will become an integral component of your planning and teaching.

Your observations will range from relatively quick and informal observations to focused, deliberate observations of individual students (see Figures 1.6 and 1.7), small groups (see Figure 1.3), or the entire class (see Figures 1.4 and 1.5). When planning, as you consider what you anticipate or expect to observe, your observations will become a natural, seamless way in which you take notice of what students are doing mathematically and use that information to guide and monitor student and class progress. Consider the following as you plan for and use observations.

- Focus on observing content understandings and student engagement with particular Standards for Mathematical Practice (e.g., reasoning, problem solving, precision, modeling with mathematics).

While you will, no doubt, observe off-task or distracting conduct/behavior as your students engage in a mathematics activity, try not to be overly distracted by such student behaviors. Take the time to make note of these behaviors as they accumulate and attend to them as needed. It will be important to consider if and how such behavior may be impacting a student's performance in mathematics. Observing, perhaps even informally timing, how long students stay on task with regard to completing a mathematics problem or related assignments may be one way to judge the impact of behaviors on mathematics performance. Some teachers make a note on the Small Group: Implementation and Recording Tool for Observations (Figure 1.3) or one of the two classroom observations tools (Figures 1.6 and 1.7), noting when and how frequently off-task and distracting behaviors actually occur. We also note that students who don't understand and are unsure of expectations may be more likely to be off task, however defined, than others.

- Remember the intent of the observation. The observation should be intentionally connected to the actual planning and implementation of the day's lesson. This is a key point.
- This is YOUR classroom. Expect a full range of responses. Recognize when students are challenged, when they seemingly "sail through" an activity, or when they exhibit signs of frustration.
- *Principles to Actions* (NCTM, 2014) notes that effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving. This is another key point directly related to your planning and to the use of observation as a formative assessment technique. How can observations be used to validate the level of engagement you desire? Note that the Individual Student: Observation Check-In tool (Figure 1.7) addresses the extent to which students are engaged at key points throughout a lesson.
- Document, document, document. Keeping a record and analysis of what is observed will more directly inform decisions during the lesson's implementation and advise your short-term and long-term planning. The observation tools (Figures 1.2–1.7) presented and discussed earlier are all classroom tested and can be electronically adapted to

meet your observation needs. Visit **http://resources.corwin.com/Formative5** to gain access to templates for the observation tools.

- Anticipate what might be observed. As you plan, what do you expect your students to do? That's what will be observed. Connecting observations to your everyday planning allows you to not only monitor your instruction, but, perhaps more importantly, anticipate or even imagine what will happen in your lesson, and adapt accordingly.

Summing Up

As a classroom-based formative assessment technique, the observation provides that initial link to planning and instruction. It allows you to consider, before the lesson is taught, what students will do, how they might engage in the mathematics, possible lesson products, issues related to student grouping, differentiation, and much more. The potential of this preteaching "look for" or noticing opportunity should influence your planning—every day. Additionally, what you actually observe within a lesson should be the catalyst for the next lesson's planning and instruction and will provide day-to-day anecdotal indicators of student progress and help you make the most of your lesson. Anticipating what you will observe will help you to determine lesson activities, problem-based tasks, and questions. Utilize the observation tools presented and discussed in this chapter (Figures 1.2–1.7). Records of what's observed will provide a pattern of student performance that is useful for monitoring progress, providing feedback to students, or guiding conferences with parents/family and others. Keeping a record of observations should also influence the pace of your lessons and decision making within a lesson, as well as provide indicators for additional longer term planning and instruction. Finally, your use of observations on a regular basis will identify the need for the regular use of interviews, the second element of the Formative 5 palette of classroom-based formative assessment techniques.