CHAPTER 1

What Is CBM and Why Should I Do It?

This book is about an assessment tool called *curriculum-based measurement* (CBM). The book begins by explaining a little bit about what CBM is and where it came from, but the majority of it will focus on the nuts and bolts (i.e., the ABCs) of how to use CBM in a classroom, school, or district to improve the quality of educational decision making.

Given the number of assessment and evaluation initiatives present in education today, you might be wondering why you need to know about CBM. That is a legitimate question.

The main thing we want you to know is that CBM is not something *additional* to do. CBM is an *alternative* to other procedures you may already be doing (or avoiding because they are time consuming or too complex to justify). Time spent assessing often takes time away from teaching—particularly if the methods are inefficient or unrelated to instruction and improved student outcomes.

Imagine that you are planning a trip and you need to drive somewhere. You have your choice of many different schedules and routes. So you decide to check the "Traditional Assessment" travel agency website. When you pull up the web page there is a list of roads between your home and your destination. With no place to enter information about where you're starting or where you're going, you can't plan a route (destinations like "in California" aren't all that helpful).

So, you try CBM Travel. The CBM page begins by asking for explicit information about your current location and your destination. It also asks exactly where you want to end up and when you want to be there. Also, CBM Travel comes with a service that monitors your progress and, by immediately noting if you get off your original route, tells you when to adjust the path you're traveling. This way you don't get further behind and will make up the time you've lost! Our guess is you will ditch Traditional Assessment Travel and go for CBM!

Here are the things you need to know about CBM before you head out:

1. CBM is not an "add-on"; CBM is an alternative. You wouldn't make your trip twice, once with Traditional Assessment Travel *and* once with CBM Travel. Why would you assess twice to make one decision?
2. CBM is a bargain. CBM gets you where you are going by helping you improve student learning in less time and with less cost.

WHY DO I NEED THIS BOOK?

This book includes a set of skills that lead to quality instruction. It is about collecting and using information. Whenever we work at something important, it is best to develop a plan before we start and to check on our progress while we are working. This allows us to work in an intentional and thoughtful way. It defines what we are trying to accomplish, alerts us when what we are doing isn't getting us closer to that goal, and gives us the information we need to determine how to change. Educating children, adolescents, and young adults certainly fits within the definition of an important activity. Therefore the process of education should include things like goal setting, planning, instruction, and monitoring. To do these things well, an educator needs information! The quality of the information you have will determine the quality of the work you do.

In the United States, for example, there are literally millions of school-age students with serious reading problems. These include students coming from low-income families or belonging to certain linguistic or racial/ethnic groups. As a result, educators have an increased responsibility to make informed decisions when working to teach important skills like reading and when tackling the needs of students who face problems learning. But it is difficult for teachers to think their way through these important efforts without something concrete to think about. CBM provides exactly the kind of functional information required to inform educational decision making. Therefore this book is designed to teach you how to get and use that information.

WHAT IS CBM?

CBM is an assessment tool characterized by certain attributes. We'll explain these attributes shortly, but first you should know what CBM "looks" like.

CBM is usually composed of a set of standardized directions, a timing device, a set of materials (i.e., passages, sheets, lists), scoring rules, standards for judging performance, and record forms or charts. The directions given are very straightforward in that they ask the student to engage in a task that is not that different than something she would do during class (e.g., read from a book, write a paragraph, or solve computation problems). The materials the student works on will look just like class materials. During CBM, as the student performs these tasks you'll see that she is timed so that her level of performance can be scored in terms of the number of responses correct and incorrect per minute (e.g., "Student reads

47 words correctly and 8 incorrectly in 1 minute"). Therefore the person giving the test will have some sort of timer. Also, you will probably see the student's level of performance on curriculum-based measures charted on a graph or entered into a computer so that trends in her learning can be analyzed over time.

When watching CBM, because you won't see the performance standards or the scoring rules being used; you might not even recognize the administration of the curriculum-based measures as a test or assessment. It will look very much like a teaching activity (except without the corrective feedback). That is because one of the supporting principles of CBM is an idea called *alignment*. The principle of alignment basically holds that your educational efforts will be more effective if you "test what you teach and teach what you test." *What* you teach is called the *curriculum*. It is the goals and objectives that must be met to achieve social and academic competence. (This is a fairly standard definition. The word *curriculum* comes from the Latin word *currer* for racing chariots. The curriculum, then, is the "course of study" to be followed on the way to the finish line.)

WHY WERE THE OTHER ATTRIBUTES, LIKE THE TIMING AND CHARTING, DEVELOPED?

CBM evolved out of work by Stan Deno and Phyllis Mirkin in the late 1970s and early 1980s at the Minnesota Institute for Research on Learning Disabilities (Deno & Mirkin, 1977). They were working on an intervention process called data-based program modification (DBPM). DBPM was a complete package of procedures for establishing goals, planning interventions (with a heavy emphasis on collaboration and consultation), and monitoring. However, in order for DBPM to work, there needed to be a continuous data collection system in place to produce the information needed to guide the decisions that fueled the program modifications. It was also needed because, as many of the instructional interventions were designed through consultation, the person delivering the lessons was not always the person responsible for the students' learning (just like today).

Deno and Mirkin realized that they needed an assessment system built on a set of common principles and composed of standardized procedures and rules. In a way, this sort of system already existed in the form of applied behavior analysis for areas such as classroom management and social behavior. But there wasn't a system like that for academic content. So Deno and Mirkin began developing CBM.

CBM is characterized by several attributes (Deno, 2003):

1. The first and most obvious is *alignment*. Within CBM the students are tested on the curriculum they are being taught. This means:
    - The content is the same;
    - The stimulus materials the student is given look the same; and
    - The responses she is expected to make are the same.

2. The measures are *technically adequate*. This means they must have established reliability and validity. For evidence of the reliability and validity of many curriculum-

based measures, you can check out the National Center on Intensive Intervention (NCII) for progress monitoring (*www.intensiveintervention.org*) and the Center on Response to Intervention for screening (*www.rti4success.org*). Even though CBM is used within classrooms by teachers, it is *not* informal assessment! "Informal assessments" typically have not been shown to be technically adequate (that's one of the things that makes them informal, not a tendency for the assessor to wear jeans and a T-shirt).

CBM is an empirically supported process with substantial technical adequacy. Over the past 30 years, there have been hundreds of solid empirical research studies in excellent journals supporting the application of CBM. In fact, because CBM is used to summarize both a student's level of performance and her rate of progress, it has been examined in ways traditional measures have never been examined.

3. CBM typically makes use of *criterion-referenced standards* as opposed to norm-referenced standards (we'll explain this later).

4. *Standardized procedures* are used for administering and scoring curriculum-based measures. All those using CBM who want to share their data with others (e.g., as part of a program evaluation or a formal student report) must follow the same administration and scoring rules. For example:

- Standard tasks are used for each content area (e.g., three 1-minute timed oral readings are used to find a student's current level of reading performance);
- Standard procedures are followed for selecting or constructing testing materials; and
- Standard administration and scoring directions are employed for each procedure.

5. *Performance sampling* is used (producing what is sometimes called *behavioral data*). CBM procedures employ direct, *low-inference* measures through which correct and incorrect student behaviors, on clearly defined tasks, are counted within a set time interval (usually in minutes). Therefore, inference and conjecture about the meaning of the resulting scores is kept to a minimum. For example, a reading CBM might tell you that the student read a fifth-grade-level passage at "47 words correct per minute with no errors."

6. Decision rules are put in place to provide those who use the data with information about what it means when students score at different levels of performance or illustrate different rates of progress on the measures over time. These rules are based on performance criteria and standardized through sampling or experimental procedures.

7. CBM emphasizes *repeated measurement* over time and can be used to identify *rates of progress* as well as *levels of performance.* Therefore, CBM data can be used for *progress monitoring* to examine learning *as it is occurring*. This allows teachers to make immediate adjustments in a student's educational program when needed. Because CBM also measures what is being taught, and learning is a change in performance over time, these repeated measures illustrate the degree to which current instructional interventions are producing learning. As a result, the use of CBM and progress monitoring allows educators to judge the quality of their own instruction (and to decide when changes need to be made). Therefore, CBM data don't just help teachers decide *what* to teach, they can also help them decide *how* to teach.

8. CBM is also *efficient*. It is efficient in implementation because people can be trained to give the measures in a short period of time and the measures can be given quickly. When you use performance data, you draw conclusions directly from what the student actually did on the test. (All educational and psychological measures require students to engage in behavior, but in many cases the original behavior, which is usually called the *raw score*, needs to be converted into another form before it can be used.) There is no need to convert the raw score for most purposes.

For example, if a student reads 47 words per minute and the criterion for this passage is 60 words per minute, then the conclusion is that she is reading 13 words per minute slower than she should. That's it!

For classroom purposes, CBM results are summarized and interpreted as simple performance statements and do not need to be converted into percentiles or normal-curve equivalents to be understood. All you need to know is that the student reading 47 words correctly per minute must be taught to read 13 words per minute faster than she is currently.

9. Last, the CBM data can be *summarized efficiently* by using a variety of techniques ranging from pencil-and-paper charts to a web-based data management system. This efficiency makes the data immediately accessible at any level of the educational system. Most important, it makes the data accessible to classroom teachers and students!

WHY IS CBM DIFFERENT FROM OTHER FORMS OF MEASUREMENT?

Many of the most important differences were spelled out in the nine attributes listed above. However, there are some fundamental CBM ideas that support those attributes.

Anyone who has spent time around education knows that there are all kinds of assessments available in schools. These range in structure from statewide accountability tests to simple handwriting rubrics. In education, we use these measures to inform our decision making. And the forms of these measures usually have to do with the functions they are designed to fulfill.

There are different forms of measures because there are different kinds of decisions to make and different ways to go about making decisions. CBM, as explained above, was designed to help teachers plan instruction and monitor outcomes to see if instruction is working. There are four ways the structures of CBM reflect this purpose: (1) by aligning with the *curriculum*; (2) by measuring *alterable variables*; (3) by employing *low-inference measures*; and (4) by employing *criterion-referenced* measures.

Curriculum

When we say a measure is curriculum-based, we expect to see that measure sampling the things that students are taught. This might not be the case for measures based on ideas about general achievement, disability type, learning style, fixed ability (e.g., intelligence or cognitive ability), developmental stages, or perceptual processing. Those tests may not be

built to target the content a student is being taught. In fact, they may actually have been written to avoid it.

Our guess is that you anticipated curriculum-based measures reflecting the curriculum (good for you!). But CBM is also designed to function within instructional systems that include systematic instructional interventions and student mastery of performance goals (such as a multi-tiered system of supports [MTSS] also called response to intervention [RTI] frameworks). That kind of system needs direct measurement of student learning to function. Measures designed to function in other problem-solving paradigms, such as the traditional student-deficit model or those that assume that instruction should yield a normal distribution of skills, are designed differently. But how are they different?

Alterable Variables

One of the most important differences between CBM and other measures used in education and psychology is that CBM targets alterable variables. In education, an *alterable variable* is something that can be changed *through instruction*. Performance on curricular tasks is considered alterable because it is under the direct control of teachers (i.e., student performance can be changed through effective instruction). CBM was not designed simply to document the existence of problems or even to determine their cause. It was designed as a data collection system that would produce the information required to guide instruction. One of the things CBM can do very well, for example, is tell a teacher about the level of a student's knowledge about a particular skill. This information has immediate implications for instruction because instruction, by definition, is the provision of new knowledge.

This brings us to the issue of alterable and unalterable variables. There is considerable debate about whether measures of unalterable student-centered variables (like perceptual processing, developmental stage, learning style, or even IQ level) provide useful information for guiding instruction. More to the point, the status of a student's curricular skills *can* be changed by the teacher through instruction. However, things like learning style, cognitive ability, and even general achievement are traditionally conceptualized as being relatively stable. As a consequence, time spent measuring them, assuming the measures work, is time spent looking at things that teachers can't do anything about. Worse yet, even if measures of those variables work, the information they yield is still useless without good information about what skills a student needs to learn—so, in the end, CBM is always needed.

Low-Inference Measures

Tools that measure one thing so that conclusions can be drawn about something else require us to make *inferences*. Those that require us to process assessment results by way of some theoretical application are called *high-inference* measures. For example, a cognitive ability test (e.g., IQ test) does not have any cognitive ability items on it, but it does have items from which the test user is expected to make *inferences* about the student's cognitive ability. Therefore, while a student may assemble geometric shapes out of blocks on a cognitive ability test, the score is not reported in terms of "geometric shape production," but in terms of

"cognitive ability." We can only accept such interpretations if we accept the theory of cognitive ability on which the inference is based.

The fact that CBM is designed to sample the observable student behaviors that occur in a classroom distinguishes it sharply from the high-inference measures often used in education and school psychology. CBM was not developed to explain how learning does or doesn't occur. And it was not designed to conform to any particular theory about how students think, attend, remember, or process information. Therefore, inference and conjecture about what the resulting scores actually mean is kept to a minimum. Curriculum-based measures employ direct (low-inference) observations during which correct and incorrect student responses to the tasks being taught (e.g., addition) are counted within a set time interval (usually in minutes). If the student works seven addition fact problems in 1 minute, her score is reported as "seven addition facts per minute." If the criterion for addition facts is 40 per minute, the seven-per-minute score is simple to interpret: It means this student needs instruction on addition!

Criterion-Referenced Measures

Another way that CBM is different from most traditional educational and psychological measures is that it escapes the normative tradition and employs criterion-referenced standards (although norms for many of the measures are also available). Criterion-referenced standards are used to determine if students can demonstrate their knowledge of certain tasks at specified performance levels (i.e., criteria). The basic assumption is that students who do not know a skill and need instruction on it will do poorly on the test of that skill. Whereas, those who *do* know the skill will pass the test.

One of the biggest problems with the utility of educational evaluation is that its history has been grounded almost exclusively in *normative standards*. There is nothing wrong with normative comparisons or the measures used to conduct them as long as your goal is to find out how a student's level of performance compares to the performance of others. But that isn't the most important thing teachers need to know! For planning a lesson, it is more important to know if the student has or hasn't mastered the skills about to be covered (or what she needs to be taught next). Knowing how a student compares to other students does not provide that information!

CBM came directly out of an intervention program and was designed to inform teachers' decisions about *what* and *how* to teach. As has already been explained, CBM was designed for instructional utility. This meant that the measures had to be:

- Aligned with curriculum;
- Sensitive to instruction;
- Repeatable so that progress monitoring could occur; and
- Criterion-referenced so that they could be used to determine when a student had mastered a task.

These conditions allow teachers to set goals, determine the level of a student's prerequisite knowledge, align instruction with outcomes, and track progress toward goals.

WHAT ARE THE MAIN ADVANTAGES OF CBM?

If we have to pick a few advantages, we will go with efficiency, alignment, and usefulness in progress monitoring. The first one, efficiency, is important because no one is going to use a measure that is awkward, confusing, or burdensome. CBM is actually quite simple to use and to understand. This means less time assessing and more time teaching.

The second choice would have to be CBM's *alignment*, or linkage, with instructional outcomes. Alignment between measurement and the curriculum being taught allows the user to make better decisions. For example, alignment improves decisions about what the student can and can't do. As you will see, CBM lets us be very precise when selecting instructional goals and determining current levels of performance.

Alignment is often lost with traditional normative measures as these are constructed by using a sample of items selected across a wide range of difficulty. (You're familiar with this format. It is the one that starts with very easy items and moves quickly through increasingly complex material.) Unfortunately, in order to cover a range of skills and keep such tests down to a manageable size, the *curricular distance* between items on these tests is often large, and very few items are provided for each skill. Alignment is lost because of the limited number of items for each skill and because some skills must be completely left off the test.

Alignment is also lost when measures use item formats presenting the student with tasks different from those he actually needs to use. For example, group-administered tests often ask students to identify answers by circling or matching them. In actual practice, students don't need to identify correct answers; they need to produce them! The two skills are different.

Our third choice is CBM's usefulness for progress monitoring. Typical normative achievement measures can't be used to decide if instruction is working within a fairly short period of time. They are designed to yield scores that are highly stable over time (a student's score on normative tests should not change across short periods), and they don't have a sufficient number of alternate forms for frequent retesting. However, CBM allows for progress monitoring by using equivalent samples in a repeated (even daily) measurement format. Frequent use coupled with alignment makes CBM more sensitive to instruction than typical achievement measures. This means it can be used to decide, within a fairly short period of time, when instruction is (or isn't) working. That means CBM can also be used to help one decide *how* to teach. It does this by letting us see, in a timely manner, if the instruction is working and/or when it should be changed.

By opening up access to progress data, CBM supplies educators with a whole new assembly of information. Given that information, they can make a whole new set of informed decisions. Information collected during the process of instruction is called *formative evaluation*. Formative evaluation was a central component of the DBPM system originally developed by Deno and Mirkin. It involves the use of information from repeated direct measures to display trends in learning so that instructional decisions can be based on levels of student progress. This is, hands down, the most powerful tool available to any teacher or school psychologist!

WHAT KINDS OF DECISIONS CAN I MAKE WITH CBM DATA?

As will be explained in Chapter 2, there are four major kinds of decisions we make in education:

1. *Universal screening decisions* to decide which students need help and which don't;
2. *Progress monitoring decisions* to decide when to move on to new goals or modify instruction;
3. *Diagnostic decisions* to decide what kind of help a student needs; and
4. *Outcome decisions* to decide when special services can be discontinued and to document the overall effectiveness of efforts across all students.

The kinds of measures we use and the ways we use them depend on which kind of decision we are trying to make. As will be explained shortly, *general outcome* and *skills-based* CBMs are often used as survey measures and *mastery measure* CBMs are often used as specific measures.

HOW DOES CBM RELATE TO MTSS OR RTI?

MTSS and RTI are terms that are often used interchangeably and often mean different things to different people. In general they include the use of data-based decision making for problem solving. Key components of any good MTSS/RTI approach are the use of assessment for universal screening and progress monitoring decisions, provision of instruction and intervention in a tiered system, such that individuals who have greater instructional needs are receiving more instruction and support. As mentioned above (and in more depth in Chapter 2), CBM is an excellent way to make universal screening and progress-monitoring decisions such as those central to MTSS/RTI.

HOW DOES CBM RELATE TO CURRICULUM-BASED EVALUATION?

The third key component of MTSS/RTI that we mentioned has to do with detailed decision making about student needs and learning. It is a hallmark of MTSS/RTI because students who are experiencing the greatest difficulties are the ones who need the most intensive teaching. Curriculum-based evaluation (CBE) is one approach to instructional decision making to meet the needs of students who are struggling. As you might have guessed from the whole "curriculum-based" thing, CBE is a systematic problem-solving process that relies heavily on CBM for the data on which we base our decisions (i.e., data-based decision making).

SO, CBM DOES JUST ABOUT EVERYTHING?

Well, it doesn't teach!

CBM is *not* an instructional method or intervention. It is a tool for improving instruction that is compatible with diverse instructional approaches. Similarly, CBM is *not* a curriculum. So there isn't a CBM reading program.

CBM is a measurement overlay, which means the CBM administration and scoring rules are like templates that can be laid over goals and objectives from an assortment of content areas. This makes CBM uniquely valuable in situations where different teachers may be using different instructional methods or the same teacher may have different students being taught in different ways.

There are sets of published curriculum-based measures that have been developed around particular sequences of goals, but the tasks and goal sequences used in those measures are not the defining elements of CBM (they are defining elements of the different tasks, objectives, and curriculums on which they are based). The defining elements of CBM are the curriculum-based procedures for designing, administering, and scoring measures as well as recording, summarizing, and interpreting the data that result from those measures. Therefore, you can't buy one CBM that will be useful for all subject areas or in all classrooms.

ARE THERE DIFFERENT TYPES OF CBM?

A measure gets to be a CBM instrument if it is designed, administered, and scored according to established CBM procedures. Three types of CBM procedures have been described: general outcome measures, skills-based measures, and mastery measures. These all share the qualities listed above but may differ in design according to their purposes and the nature of the skills they are designed to test.

General Outcome Measures

General outcome measures (GOMs) are used to sample performance across several goals at the same time by using capstone tasks that are complex in the sense that they can only be accomplished by successfully applying a number of contributing skills. In this measurement format, the contributing skills (i.e., subskills) are not separated out for direct attention as they are in the skills-based measures and mastery measures we'll describe shortly. Instead, success or improvement on the GOM is assumed to reflect the synthetic application of the contributing skills. In this sense, GOMs are holistic, while mastery measures in particular, are atomistic.

Probably the best example of a GOM is oral passage reading. In order for a student to be able to read proficiently, she must be able to use a variety of skills at the same time. Those include the skills required to use letters, letter combinations, blending, vocabulary, syntax, and content knowledge. As a student improves in any of these skills you can expect to see some improvement in her oral passage reading. As a result, using oral reading as the GOM relieves you of the need to monitor each of these subskills separately (whether they are taught in isolation or in combination).

There are several obvious advantages to GOMs. The first is that they dramatically cut down on the number of different measures one has to introduce, manage, administer, score, and track. Having four or five GOMs to cover the areas addressed throughout a year, a teacher can have her monitoring system for the whole year in place on the first day. The use of GOMs also recognizes the limitations of isolating subskills from the context in which they normally are expected to function. Any time you present tasks in a format that is different from the way they will usually be used (e.g., asking students to read nonsense words or the sounds of letters in isolation), there is the risk that you will lose validity. A final advantage is that visual displays of progress on a GOM will show longer acquisition slopes, allowing adequate opportunities for progress monitoring and data-based instructional modifications.

For the reasons listed above, GOMs are especially useful for universal screening and progress monitoring to get an overview of level of performance. The primary disadvantage of GOMs is the downside of all general procedures: they are *general*. If your student's oral reading is inadequate and you think you need specific information about her relative skill patterns, you may not get that information from a GOM. Another limitation of GOMs is that some curriculum areas do not have a capstone task that represents the synthetic application of most of the content (especially one that is reasonably convenient to use). For example, GOMs are difficult to develop in mathematics beyond the early grades.

Skills-Based Measures

Skills-based measures (SBMs) are designed to accomplish many of the functions of GOMs. They also have their particular advantages and disadvantages. Their main advantages are that they can be used to screen and progress monitor in curriculum domains where capstone tasks are not available.

The best example of an SBM is probably math computation. At any particular grade level, a math curriculum for computation is made up of a list of specific skills. For example, a second-grade curriculum might include addition facts, double-digit addition without regrouping, double-digit addition with regrouping, and subtraction facts. There is no single task to demonstrate proficiency on all of these skills—each needs to be measured directly, using an SBM.

SBMs are constructed by first identifying the set of goals that will be taught within a curriculum area. The time frame you will cover could sample goals for an entire year or for shorter periods. Once the goals have been identified, items are then prepared to assess each goal. The items for the same goal should be of equal difficulty. Next, the items are placed in random order (from the student's perspective) into a set of tests (in fact, they should be in a deliberate order, but one that is not readily identifiable). This produces a set of equivalent measures providing balanced coverage of the same content.

The items on these tests are not placed in the order in which they are taught or in order of complexity. All of the items covering the same goal are not grouped together. Items should be arranged so that each goal is equally represented in each section (i.e., beginning, middle, and end) of the test. It is good to note what skills each item is measuring, however, so that you can link performance on the measure back to instructional objectives.

SBMs are generally administered by including directions like "Work as many items as you can. If you come to one you don't know, you can skip it." When given these directions

and measures constructed as we have described them, students who are beginning to work on a set of skills will skip many problems and get lower scores. As they progress through the curriculum and learn new skills, their scores will improve because there will be more items they can work. Therefore, SBMs can sometimes be used to progress monitor, as they will produce long acquisition slopes like GOMs do. In addition, they can yield some analytical information as long as steps are taken to ensure that an adequate sample of each kind of item is provided and that the items are cross-referenced to goals.

One big disadvantage of SBMs is that when instruction begins, most of the items will be irrelevant to the student because they will be above her current level of performance. Near the end of instruction, most of the items will again be irrelevant because she will have already learned them. Basically, this means that at any given time only a few items on the test will be directly related to what the student is currently learning.

Mastery Measures

The last type of CBM is the mastery measure (MM). MMs differ from GOMs and SBMs in several ways, mainly in the relative levels within the curriculum from which tasks are drawn and the relative sizes of the measurement net they spread. (The term *measurement net* refers to the size and nature of the sample a measure collects. For example, a test covering 25 computation skills would be casting a larger measurement net than one covering five skills.) GOMs present tasks that are relatively more complex and/or advanced than do MMs; SBMs tend to cover more skills than MMs (i.e., they measure more by casting a wider net). Therefore, MMs are generally used on parts of the curriculum that contain discrete and easily identified sets (or domains) of items that are closely related by some common skill, theme, concept, or solution strategy. Examples of this sort of domain might include punctuation (for writing), multiplying fractions (for math), or sounds of letters (for early reading).

MMs are used in three situations:

1. When you really want to focus on a particular set of skills. These might include the so-called *tool skills*, which need to be performed at high levels of proficiency (e.g., letter formation, using the silent *e* to convert vowels, computation facts). Focus might also be important for skills that are pivotal to many other operations, like quickly going through the steps of multiplying fractions;
2. When you are trying to troubleshoot a problem and need to do specific-level testing (e.g., to see if a student is having trouble with reading comprehension because he doesn't know how to tell relevant from irrelevant information); and
3. To monitor learning when a skill is being taught in isolation. (It is important to note that, even if an MM focuses on an isolated skill, it does not mean that skill should be taught in isolation. The skill is measured in isolation only for purposes of focus.)

The disadvantages of MMs come with their narrow focus. They are not good for surveying general levels of performance or for monitoring growth on long-term goals. Using a series of MMs to progress monitor will produce a profile of closely packed peaks and valleys that look like the teeth on a saw blade (see Figure 1.1). This profile emerges because,

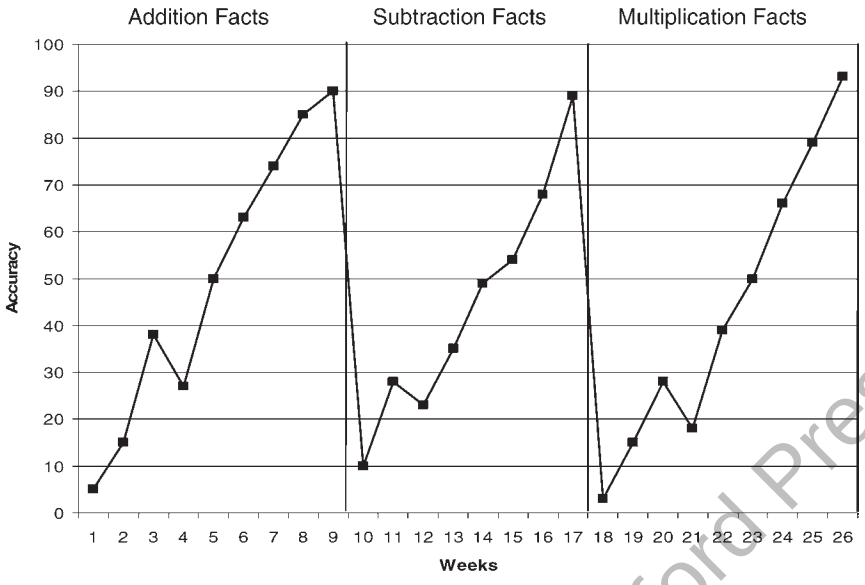

FIGURE 1.1. Example of an MM progress monitoring profile.

as soon as a student starts getting high scores on one of the very specific measures, a new one is introduced, and her score goes back down. That is called a *measurement shift* (or as we sometimes like to call it, "jumping off cliffs"). A GOM or SBM covering what amounts to the same slice of curriculum covered by a series of MMs won't produce these measurement shifts and will provide the long classic learning curve needed for decision making (see Figure 1.2).

A brief summary of the attributes for each type of measure is provided in Table 1.1.

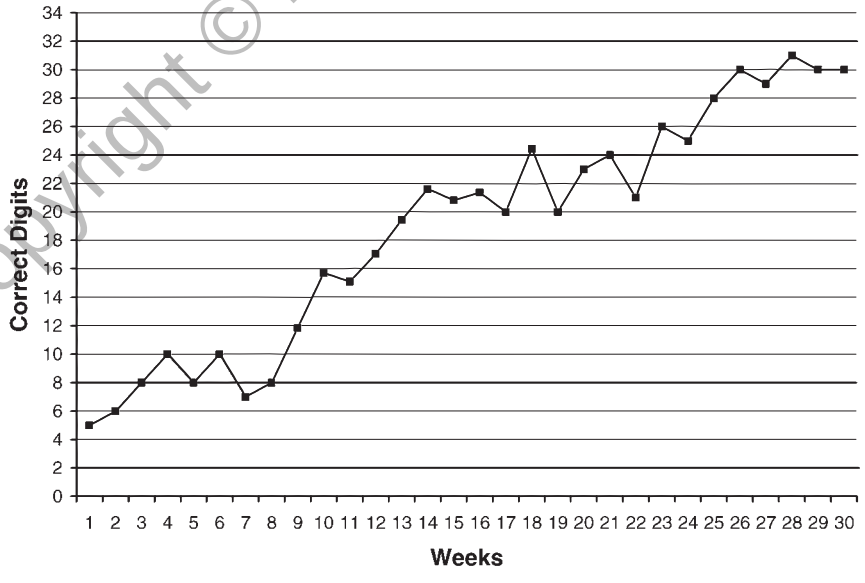

FIGURE 1.2. Example of a GOM or SBM progress monitoring profile.

TABLE 1.1. Comparison of the Three Types of Curriculum-Based Measures

General outcome measures (GOMs)	Skills-based measures (SBMs)	Mastery measures (MMs)
	Primary uses	
• Screening • Survey-level testing • Progress monitoring	• Screening • Survey-level testing • Progress monitoring	• Diagnostic evaluation • Specific-level testing • To target content areas of concern • To target different proficiency levels and response types
	Structure	
• Uses global/interactive tasks • Separate skills are not isolated or marked • Targets long-term goals • Often includes common classroom tasks	• Composed of mixed items drawn from a set of goals • Skills are usually sampled across a whole year's curriculum • Separate skills may be isolated or marked • Items are often cross-referenced to goals	• May only test one specific skill or short-term instructional objective • A large sample of performance is collected on each skill • Items are referenced to skills and/or proficiency levels • Some skills may be examined in isolation
	Advantages	
• Provides perspective • Gives an overall impression of skill level • Useful for monitoring • No measurement shifts • Illustrates retention and generalization	• Gives an overall impression of skill level • Useful for monitoring • No measurement shifts • Illustrates retention	• Useful for double-checking a problem indicated on a GOM or SBM • Useful for checking hypotheses about missing skills or subskills • Provides focus
	Disadvantages	
• Provides little diagnostic information • Doesn't provide information about specific skills • Often includes a high proportion of items that are either above or below the student's skill level • Some content areas don't have convenient capstone tasks	• Small sample for each goal limits diagnostic utility • Often includes a high proportion of items that are either above or below the student's skill level • May not require generalization or interactive use of the skill	• Doesn't provide the big picture (no generalization or application) • Skill–subskill relationships may not be real • Can't be used for progress monitoring

I HAVE NEVER SEEN CBM BEING USED— IF IT'S SO GREAT, WHY ISN'T IT MORE POPULAR?

There are probably several reasons. We think the main one is that, until recently, the general education community hasn't been asking the kinds of questions CBM answers, but that has changed. Part of the change is because of increased professional and legislative emphasis on accountability, and part of it is because of the popularity of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and other CBM products. DIBELS started out as the application of CBM to early literacy skills, the same skills that were later given significance by the National Institute of Child Health and Human Development (2000) and National

Research Council (1998) reports. Within a couple of years after those reports came out, the DIBELS measures had been administered to literally millions of students in general education, particularly within the context of state-level reading improvement initiatives (e.g., Reading First programs).

There has been some debate about whether or not DIBELS is CBM. For the most part, it seems accurate to say that DIBELS applies CBM procedures to early reading tasks; however, there are differences in some scoring rules and item formats. Other modifications have also evolved with the development of web-based CBM management systems such as aimsweb, EasyCBM, and FastBridge Learning. Most of these changes seem to fall under the heading of fine-tuning and are probably to be expected as the application evolves for new populations and content areas.

Over the last decade more and more educators have become familiar with CBM. This is in large part due to the number of publishers who have CBM products available for the masses. It is also becoming more and more common for people to screen students on key skills like reading and math. Since curriculum-based measures offer some of the best psychometrically sound assessments for this purpose they are becoming more and more popular with educators in both the general and special education fields.

IS CBM USED WITH SPECIAL EDUCATION OR GENERAL EDUCATION?

CBM was originally used in special and remedial education because its ability to target specific skills and its sensitivity to instruction making it particularly useful for adjusting instruction to individual student needs, but special educators really aren't the only ones who do that. As mentioned, the use of CBM by general educators has been growing. This is, in part, due to the expansion of MTSS/RTI as a service delivery model. As also mentioned, everyone has become increasingly aware of the need to screen and progress monitor students in order to catch those who are falling behind as soon as possible. It is particularly important to progress monitor in high-impact content like reading, oral language, written expression, math, and social skills (as you'll find, not all of these areas are covered in this book). As a result, CBM is being increasingly adopted by whole school districts (and states) as a system for use with all students.

WHO GIVES CBM MEASURES?

It depends on why the measures are being given. Often curriculum-based measures are used three times over the course of the year to screen all students by looking at their level of performance and rate of progress in key skills like reading, math, and written expression. The reading comprehension, math, and written expression measures can all be group administered. If you are well prepared, math and written expression (depending on the grade level of the students) take from 5 to 10 minutes each. Oral reading requires individual administration and, if the flow of students and materials is managed smoothly, one person should be able to

collect three individual reading samples from a student in another 5 minutes. The process takes, at most, 20 minutes of actual student testing time. Most of that time will be in group-administered activity. For the reading, because all students in a school are being tested during universal screening, the actual administration might be conducted by a team of general education teachers, special education teachers, school psychologists, reading specialists, and teaching assistants. We do not recommend using community contacts such as parents, volunteers, or peers for universal screening because of issues of confidentiality and organization.

Time spent preparing materials, organizing the space, and training people in how to administer, score, and record will pay off. Once all the testing is done, the data are then entered into a computer or web-based management system by someone on the school staff (again, not community volunteers). Many publishers also have the ability to directly enter student responses into a computer program, decreasing the time needed to manage the data and increasing the reliability of scoring since scores do not need to be transferred into another system. The other benefit of these computer programs is immediate assess to the data. In Chapter 11, we provide a guide for setting up and managing CBM measures and related activities.

Giving curriculum-based measures for the purpose of analyzing learning problems is a different matter. This book is really not about diagnostic assessment. Assessment for diagnostic purposes is usually carried out by someone who is an expert in the content area of concern as well as CBE. This person could be a general education teacher, special education teacher, content-area specialist, or school psychologist. When curriculum-based measures are given for analysis of a learning problem, there is no standard set of tests. Instead, specific measures are selected to check on the presence or absence of those skills suspected to be causing the problem. In order to do this, we need to have a set of these measures available, but unfortunately, there are not any such complete sets of measures. There are a few resources for developing or identifying such materials, and these are provided in the "Resources and/or Further Reading" section of Chapter 2.

Finally, CBM is also used to monitor the effectiveness of instruction by giving the students repeated measures of the same skills over time in order to see trends in their learning.

IF I WANT TO USE CBM, DOES THIS MEAN I'LL NEED TO MAKE TESTS OUT OF THE INSTRUCTIONAL MATERIALS I'M USING?

The short answer is "no." Because one of the hallmarks of CBM is technical adequacy, it is best to use published or otherwise openly available materials that have been evaluated. For universal screening and progress-monitoring decisions, reliable and valid instruments are a must. Enjoy having someone else do that work.

The long answer (in case you're wondering) is that this is an important question and an issue of some debate. The answer depends on the answer to another question that would seem to be fairly basic for people interested in CBM—namely, "What is the definition of *curriculum*?" We have said that curriculum is "what you teach," meaning it is the standards that must be met for students to achieve social and academic competence, but some people

define curriculum to include "what you *use* to teach" (meaning the teaching materials being used).

If you take the "use" view, the curriculum is not just the skills that are taught, but also the approach through which they are being taught. Therefore, you would want program-specific measures (e.g., if your reading materials used numerous illustrations, you would have illustrations on your reading CBM).

If you take the "what" view of curriculum, you don't need to have tests using the same formats and examples as the instructional materials. You want tests that address the same skills and predict important outcome measures without using the exact same materials. You would be able to choose from already available generic measures. We subscribe to the "what" view. Here are some reasons for our position:

1. *Instructional programs don't follow the same sequences and schedules.* One of the biggest challenges in education is that what is taught and when it is taught really is not standardized across schools (even though the Common Core State Standards provide a fairly common set of standards to be achieved at the end of a grade level). It certainly is not standardized across published instructional programs. Obviously, this creates major problems in a mobile society.

2. *Program-specific tests may not tell you if the learning has generalized.* Our particular opinion is that you should carefully review and select the curriculum and then measure skills without being bound to any particular set of instructional materials. In fact, some may actually prefer to use CBM items that are somewhat different or at least mixed, to try to ensure that learning has generalized (you don't want a student who can only work problems that are presented in a certain format).

3. *Program-specific tests will make the teacher dependent on the program.* Instructional materials do not remain constant. They are often revised, or teachers select new ones. If teachers use program-specific tests, they will have to produce new ones every time a new program is selected. Wouldn't you rather put your energy into teaching?

WHERE DO I GET CBM MATERIALS?

There are many sources of CBM materials. Some must be purchased, and others are free. There are also materials that can be accessed on the web. Materials for the content areas addressed in this book will be referenced in those chapters. Just remember that when you select materials for CBM, you must have these two things:

1. *Alignment:* The materials must match the task, standards, and outcomes. This means the materials you select must sample the content you are interested in (e.g., reading) and call for the student to produce the same skills you are teaching (e.g., reading orally).
2. *Adequate sampling:* Be sure there are enough items and that the time interval is long enough to allow the student the opportunities needed to display her knowl-

edge. A good sample of behavior is necessary to make decisions about what a student knows.

Also remember that there is more to evaluation than giving a test. You have to score it properly, record the data accurately, and interpret them correctly. This book will give you information about CBM scoring rules and the interpretation of scores. Assessment is carried out to inform decision making; we need to know what the scores mean in order to use them.

SO, WHERE DO WE GO FROM HERE?

Our goal for this first chapter of the book has been to answer some of the fundamental questions that are asked about CBM in general terms of the "whats" and "whys." Chapter 2 provides additional detail putting CBM into a broader framework of decision making in education. For the rest of the book, we turn to the "hows," as in "How do I implement CBM?"

Chapters 3 through 9 each provide, for different areas of the curriculum, a rationale for using CBM, a list of materials needed and where to get those materials, directions and scoring procedures, how often it should be administered, how much time it will take to administer and score, information about the different types of CBM scores, how to write IEP goals and objectives, and frequently asked questions. Chapter 10 will take you through the process and procedures for setting goals and graphing the data as well as describe how CBM fits into an MTSS/RTI model. Chapter 11 provides a guide for how to use CBM, how to get it going, and how to sustain it. Appendix A provides norms for some of the reading CBM measures covered in Chapters 3 and 4, which have benchmarks that are provided within those chapters. All other norm tables are provided within the content chapters since there are no benchmarks currently available. Appendix B provides resources that can be photocopied and used while conducting CBM, including quick administration and scoring guides for each CBM skill covered in this book; two checklists for conducting CBM; and a graph to plot the data.

The chapters are structured this way to serve as a reference when you are implementing CBM. When using math materials, it is important to know about the administration directions, scoring, and standards for comparison that are specific to math. Graphing and setting or writing goals is a similar process no matter what the content area, so it wouldn't make sense to have to look up writing goals in the reading chapter when you want to write math goals!

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