RTI Toolkit: A Practical Guide for Schools

Promoting Success for Special-Needs Students in General-Education Classrooms: Grades 3-12

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How To: Match the Student to the Right Academic Intervention with the Instructional Hierarchy

Teachers recognize that learning is a continual process of growth and improvement. The student who grapples with the rudiments of a skill such as reading appears very different from the more advanced student who is a proficient and self-motivated reader. Intuitively, then, educators understand that students advance through predictable stages of learning as they move from novice to expert in a particular skill.

The Common Core Standards, too, acknowledge advancing levels of learning, as can be seen in their wording. For example, a 6th-grade Common Core Standard for Mathematics on the Number System (CCSM.6.NS.2) states that the student will "fluently divide multi-digit numbers using the standard algorithm." (National Governors Association Center for Best Practices et al., 2010; p. 42). This standard assumes that the successful student is both (1) accurate and (2) proficient (i.e., fluent) in multi-digit division--and implies as well that the student (3) will retain the skill over time, (4) will have the endurance to complete grade-appropriate tasks that include the skill, and (5) can flexibly apply or generalize the skill to those situations and settings in which multi-digit division will be useful.

The Instructional Hierarchy-IH (Haring et al., 1978) is a helpful framework to analyze stages of student learning. The Instructional Hierarchy breaks the learning process into several levels, shifting from skill acquisition through skill mastery toward full integration of the skill into the student's academic repertoire. As presented here, the Instructional Hierarchy consists of 5 levels (Haring et al., 1978; Martens & Witt, 2004): Acquisition, fluency, retention, endurance, and generalization. Although initially formulated several decades ago, the Instructional Hierarchy is widely used as a model of learning in contemporary research into effective instruction and academic intervention (e.g., Ardoin & Daly, 2007).

By linking a particular student's target skill to the corresponding IH learning stage, the teacher can gain insight into what instructional supports and strategies will help that student to attain academic success. This linkage of learner to learning stage increases both teacher confidence and the probability for a positive student outcome. The table below (adapted from Haring et al., 1978 and Martens & Witt, 2004) gives instructors a brief description of each learning stage in the Instructional Hierarchy, along with suggested instructional strategies and a sample intervention idea:

<table>
<thead>
<tr>
<th>1. Acquisition</th>
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<tr>
<td><strong>Goal.</strong> At the beginning of the acquisition stage, the student has just begun to acquire the target skill. The objective is for the student to learn how to complete the skill accurately and repeatedly—without requiring the help of another.</td>
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<tr>
<td><strong>Instructional Strategies.</strong> When just beginning a new skill, the student learns effectively through learning trials, in which the teacher: (1) <em>models</em> how to perform the skill, (2) <em>prompts</em> the student to perform the skill; and (3) <em>provides immediate performance feedback</em> to shape the student's learning in the desired direction. The teacher can maintain student motivation by providing frequent 'labeled praise' (that is, praise that specifically describes the student's positive academic behaviors and effort) and encouragement. As the student becomes accurate and more independent in the skill, the teacher can gradually fade prompting support.</td>
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| **Sample Intervention Idea.** *Cover-copy-compare* is a student-delivered intervention that promotes acquisition of math-facts or spelling words (Skinner, McLaughlin, & Logan, 1997). The student is given a blank index card and a worksheet with spelling words or math-facts (with answers) appearing in the left column. One at a time, the student studies each original model (spelling word or math fact), covers the model with index card, from memory copies the model (spelling word or math-fact equation and answer)
into the right column of the worksheet, then uncovers the model to confirm that the student work is correct. NOTE: This intervention is most appropriate for use as the student has acquired some accuracy and independence in the target skill.

### 2. Fluency

**Goal.** The student who advances into the fluency stage can complete the target skill with accuracy but works relatively slowly. The objective is for the student to maintain accuracy while increasing speed of responding (fluency).

**Instructional Strategies.** The student who has acquired the skill but must become more proficient benefits from (1) brief, frequent opportunities to practice the skill coupled with (2) instructional feedback about increasing speed of performance (Martens & Witt, 2004). To facilitate fluency-building, the teacher structures group learning activities to give the student plenty of opportunities for active (observable) responding. The student is also given multiple opportunities for drill (direct repetition of the target skill) and practice (combining the target skill with other skills to solve problems or accomplish tasks). The student receives feedback on the fluency and accuracy of the academic performance, as well as praise and encouragement tied to increased fluency.

**Sample Intervention Idea.** An example of a group strategy to promote fluency in math-facts is *explicit time drill* (Rhymert et al., 2002). The teacher hands out a math-fact worksheet. Students are told that they will have 3 minutes to work on problems on the sheet. The teacher starts the stopwatch and tells the students to start work. At the end of the first minute in the 3-minute span, the teacher ‘calls time’, stops the stopwatch, and tells the students to underline the last number written and to put their pencils in the air. Then students are told to resume work and the teacher restarts the stopwatch. This process is repeated at the end of minutes 2 and 3. At the conclusion of the 3 minutes, the teacher collects the student worksheets.

### 3. Retention

**Goal.** At the start of the retention stage, the student is reasonably fluent but is at risk of losing proficiency in the target skill through lapses in use. At this point, the objective is to ‘overlearn’ the skill to insure its retention even after long periods of disuse.

**Instructional Strategies.** Frequent opportunities for practice can be an effective method to entrench a skill and help the student to retain it over time (Martens & Witt, 2004). The teacher can schedule numerous practice episodes within a short time (‘massed review’) to promote initial fluency and then reinforce longer-term retention of the skill by scheduling additional periodic review (‘distributed review’) across longer spans of several weeks or even months (Pashler et al., 2007).

**Sample Intervention Idea.** An illustration of an intervention to promote retention is *repeated reading* (Lo, Cooke, & Starling, 2011). This intervention targets reading fluency: The student is given a passage and first ‘rehearses’ that passage by following along silently as the tutor reads it aloud. Then the student reads the same passage aloud several times in a row, with the tutor giving performance feedback after each re-reading. If a teacher uses a fluency-building strategy such as repeated reading but sets an ambitious outcome goal that is above the minimum benchmark for success, the resulting ‘overlearning’ can support long-term retention of the skill. For example, a 4th-grade teacher uses repeated reading with a student during a mid-year intervention and tracks the student's reading fluency using timed 1-minute curriculum-based measurement oral reading fluency passages. Benchmark norms (Hasbrouck & Tindal, 2005) suggest that the student will cross over into the 'low-risk' range for reading fluency if he can read at least 87 words
per minute according to the mid-year benchmark norms for grade 4. The teacher decides instead to overshoot, setting the outcome goal to a higher 95 words per minute (‘overlearning’) to give the student an additional margin of reading fluency to promote long-term skill retention.

4. Endurance

**Goal.** At the onset of the endurance stage, the student has become fluent in the target skill but will engage in it only reluctantly or for brief periods. The goal is to have the student persist in the skill for the longer intervals of time required in the classroom setting or expected for the student's age group. (Martens & Witt, 2004)

**Instructional Strategies.** Several instructional ideas can promote increased student endurance. In structuring lessons or independent work, for example, the teacher can gradually lengthen the period of time that the student spends in skills practice or use. The student can also be enlisted to self-monitor active engagement in skill-building activities--setting daily, increasingly ambitious work goals and then tracking whether he or she successfully reaches those goals. NOTE: If a student appears to lack ‘endurance’, the teacher should also verify that the fundamentals of good instruction are in place: for example, that the student can do the assigned work (instructional match), adequately understands directions, is receiving timely performance feedback, etc.

**Sample Intervention Idea.** An idea to increase student endurance provides breaks between gradually lengthening work intervals ('fixed-time escape': adapted from Waller & Higbee, 2010). This strategy can be used with groups or individual students. The teacher first selects a target activity for endurance-building (e.g., independent reading). The teacher then sets the length of work periods by estimating the typical length of time that the student or group will currently engage in the activity (e.g., 5 minutes) before becoming off-task or disruptive. The teacher also decides on a length for brief ‘escape’ breaks (e.g., 2 minutes)--times when students can stop work and instead take part in preferred activities.

At the start of the intervention, the teacher directs the student or group to begin the target work activity. At the end of the work interval (e.g., 5 minutes), the teacher announces that the student or group can take a short break (e.g., 2 minutes). When that break is over, students are directed to again begin work. This sequence (work interval, escape interval) repeats until the scheduled work period is over. As students are able successfully to remain engaged during work periods, the teacher can gradually extend the length of these work periods by small increments, while reducing and then fading escape breaks, until work periods reach the desired length.

5. Generalization

**Goal.** At the beginning of the generalization stage, the student is accurate and fluent in using the target skill but does not always employ the skill where or when needed. The goal of this phase is to motivate the student to apply the skill in the widest possible range of appropriate settings and situations.

**Instructional Strategies.** The teacher can promote generalization of skills by first identifying the types of situations in which the student should apply the target skill and then programming instructional tasks that replicate or mimic these situations. So the teacher may create lessons in which students can generalize the target skills by interacting with a range of people, working with varied materials, and/or visiting different settings. The teacher can also use explicit prompts to remind students to apply skills in specific situations.

**Sample Intervention Idea.** For a student who does not always generalize the skill of carefully checking math assignments before turning them in, the teacher can work with that student to create a math self-
correction checklist (Uberti, Mastropieri, & Scruggs, 2004). Teacher and student meet to create a checklist of that student's most common sources of errors on math assignments. The student is then expected to use the checklist to review math work before submitting to the teacher. This intervention strategy can be adopted to other disciplines (e.g., writing assignments) as well. And completed checklists can be collected with assignments to verify student use.

References


Using Accommodations With General-Education Students: Teacher Guidelines

Classrooms in most schools look pretty much alike, with students sitting at rows of desks attending (more or less) to teacher instruction. But a teacher facing any class knows that behind that group of attentive student faces lies a kaleidoscope of differences in academic, social, self-management, and language skills. For example, recent national test results indicate that well over half of elementary and middle-school students have not yet attained proficiency in mathematics (NAEP, 2011a) or reading (NAEP 2011b). Furthermore, 1 in 10 students now attending American schools is an English Language Learner (Institute of Education Sciences, 2012) who must grapple with the complexities of language acquisition in addition to the demands of academic coursework.

Teachers can increase the chances for academic success by weaving into their instructional routine an appropriate array of classwide curricular accommodations made available to any general-education student who needs them (Kern, Bambara, & Fogt, 2002). However, teachers also know that they must strike an appropriate balance: while accommodations have the potential to help struggling learners to more fully engage in demanding academics, they should not compromise learning by holding a general-education student who accesses them to a lesser performance standard than the rest of the class. After all, students with academic deficits must actually accelerate learning to close the skill-gap with peers, so allowing them to do less is simply not a realistic option.

Read on for guidelines on how to select classroom accommodations to promote school success, verify whether a student actually needs a particular accommodation, and judge when accommodations should be used in instruction even if not allowed on state tests.

Identifying Appropriate Accommodations: Access vs. Target Skills. As an aid in determining whether a particular accommodation both supports individual student differences and sustains a demanding academic environment, teachers should distinguish between target and access skills (Tindal, Daesik, & Ketterlin, 2008). Target skills are those academic skills that the teacher is actively trying to assess or to teach. Target skills are therefore 'non-negotiable'; the teacher must ensure that these skills are not compromised in the instruction or assessment of any general-education student. For example, a 4th-grade teacher sets as a target skill for his class the development of computational fluency in basic multiplication facts. To work toward this goal, the teacher has his class complete a worksheet of 20 computation problems under timed conditions. This teacher would not allow a typical student who struggles with computation to do fewer than the assigned 20 problems, as this change would undermine the target skill of computational fluency that is the purpose of the assignment.

In contrast, access skills are those needed for the student to take part in a class assessment or instructional activity but are not themselves the target of current assessment or instruction. Access skills, therefore, can be the focus of accommodations, as altering them may remove a barrier to student participation but will not compromise the academic rigor of classroom activities. For example, a 7th-grade teacher assigns a 5-paragraph essay as an in-class writing assignment. She notes that one student finds the access skill of handwriting to be difficult and aversive, so she instead allows that student the accommodation of writing his essay on a classroom desktop computer. While the access skill (method of text production) is altered, the teacher preserves the integrity of those elements of the assignment that directly address the target skill (i.e., the student must still produce a full 5-paragraph essay).

Matching Accommodations to Students: Look for the 'Differential Boost'. The first principle in using accommodations in general-education classrooms, then, is that they should address access rather than target
academic skills. However, teachers may also wish to identify whether an individual actually benefits from a particular accommodation strategy. A useful tool to investigate this question is the 'differential boost' test (Tindal & Fuchs, 1999). The teacher examines a student's performance both with and without the accommodation and asks these 2 questions: (1) Does the student perform significantly better with the accommodation than without?, and (2) Does the accommodation boost that particular student's performance substantially beyond what could be expected if it were given to all students in the class? If the answer to both questions is YES, there is clear evidence that this student receives a 'differential boost' from the accommodation and that this benefit can be explained as a unique rather than universal response. With such evidence in hand, the teacher should feel confident that the accommodation is an appropriate match for the student. (Of course, if a teacher observes that most or all of a class seems to benefit from a particular accommodation idea, the best course is probably to revise the assignment or assessment activity to incorporate the accommodation!)

For example, a teacher may routinely allocate 20 minutes for her class to complete an in-class writing assignment and finds that all but one of her students are able to complete the assignment adequately within that time. She therefore allows this one student 10 minutes of additional time for the assignment and discovers that his work is markedly better with this accommodation. The evidence shows that, in contrast to peers, the student gains a clear 'differential boost' from the accommodation of extended time because (1) his writing product is substantially improved when using it, while (2) few if any other students appear to need it.

Classroom Accommodations and State Tests: To Allow or Not to Allow? Teachers may sometimes be reluctant to allow a student to access classroom accommodations if the student cannot use those same accommodations on high-stakes state assessments (Tindal & Fuchs, 1999). This view is understandable; teachers do not want students to become dependent on accommodations only to have those accommodations yanked away at precisely the moment when the student needs them most. While the teacher must be the ultimate judge, however, there are 3 good reasons to consider allowing a general-education student to access accommodations in the classroom that will be off-limits during state testing.

1. **Accommodations can uncover 'academic blockers'.** The teacher who is able to identify which student access skills may require instructional accommodations is also in a good position to provide interventions proactively to strengthen those deficient access skills. For example, an instructor might note that a student does poorly on math word problems because that student has limited reading decoding skills. While the teacher may match the student to a peer who reads the word problems aloud (texts read) as a classroom accommodation, the teacher and school can also focus on improving that student's decoding skills so that she can complete similar math problems independently when taking the next state examinations.

2. **Accommodations can promote content knowledge.** Students who receive in-class accommodations are likely to increase their skills and knowledge in the course or subject content substantially beyond the level to be expected without such supports. It stands to reason that individuals whose academic skills have been strengthened through the right mix of classroom accommodations will come to the state tests with greater mastery of the content on which they are to be tested.

3. **Accommodations can build self-confidence.** When students receive classroom accommodations, they are empowered to better understand their unique pattern of learning strengths and weaknesses and the strategies that work best for them. Self-knowledge can build self-confidence. And not only are such students primed to advocate for their own educational needs; they are also well-placed to develop compensatory strategies to manage difficult, high-stakes academic situations where support is minimal--such as on state tests.
References


How To: Reduce Time-Outs With Active Response Beads

Students with behavioral disorders or ingrained patterns of non-compliant or defiant behaviors may receive in-class or out-of-class time-out as a disciplinary consequence. However, use of time-out (from reinforcement) has the serious drawback that students miss instruction while in time-out. Furthermore, because students are often directed to time-out when emotionally upset, there is a significant likelihood that they will resist the time-out placement, thus creating the potential for teacher-student power-struggles, classwide disruptions, and other negative outcomes.

Active-Response Beads-Time Out (ARB-TO: Grskovic et al., 2004) is an intervention to replace in-class time-out that is easy to use. It promotes students' use of calm-down strategies when upset, enhances behavioral self-management skills, and minimizes exclusion from academic activities.

Preparation. The teacher makes a sufficient number of sets of Active Response Beads (ARBs) to use in this intervention—depending on whether the strategy is to be used with one student, a small group, or the entire class.

The materials needed to create a single Active Response Bead set are:

- ten 3/4-inch/1.9-cm beads with hole drilled through middle
- A 38-cm/15-inch length of cord

To make a set of Active Response Beads, the teacher strings the 10 beads on the cord and ties a knot at each end.

Training. The teacher meets for at least 2 sessions with the student(s) who will be using the Active Response Beads-Time Out strategy. The teacher introduces ARB-TO as a way to self-manage emotions and classroom behaviors to increase classroom success and reduce number of time-outs. In each training session, the teacher and student practice steps of the ARB-TO procedure (outlined below). Training concludes when student(s) demonstrate understanding and compliance with the procedure.

Procedure. The ARB-TO can be used whenever the student displays defiant, non-compliant, acting-out, or escalating behaviors (e.g., refuses to engage in classwork, leaves seat without permission, talks out, makes rude or inappropriate comments or gestures, or engages in less-serious acts of aggression or property destruction). NOTE: Educators should be aware that the teacher's role in providing prompts, feedback, and praise to the student throughout the ARB steps is crucial to the intervention's success.

Here are the 4 ARB-TO steps:

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<tr>
<th>1</th>
<th>Teacher Initiates ARB-TO Strategy</th>
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<tbody>
<tr>
<td>Teacher:</td>
<td>The teacher directs the student to &quot;go get an ARB&quot;.</td>
</tr>
<tr>
<td>Student:</td>
<td>The student walks to the teacher's desk (or other classroom location), picks up a set of Active Response Beads and returns to seat.</td>
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</table>
### Student Uses Active Response Beads

**Teacher:** The teacher praises compliance and directs the student to begin the ARB-TO procedure:

"Thanks for getting your ARB. You need think-time for [describe problem behavior]. Put your head on the desk and use your ARB."

**Student:** The student puts head on desk and counts down slowly from 10 to 1. The student starts counting in an audible voice. With each number in the count, the student:

- takes a deep breath and slowly releases;
- moves a bead along the cord from the left to the right side of the ARB;
- gradually reduces voice volume—to conclude in a whisper on the last number.

Upon completing the count, the student raises head from desk.

### Student Returns ARB to the Teacher

**Teacher:** The teacher praises successful use of the ARB-TO strategy and prompts the student to return the ARB to the teacher

"Good job using the ARB. Please bring it up to me."

**Student:** The student gives the teacher the ARB and returns to seat.

### Teacher Redirects the Student to Academic Task

**Teacher:** The teacher again praises use of ARB-TO, directs the student to resume the academic task or rejoin the academic activity, and offers support as needed.

"Thanks for using the ARB and for returning it to me. Please continue with your assignment/rejoin our activity. I will be over to check on how you are doing in a moment."

**Student:** The student resumes the academic task or rejoins the learning activity.
Adaptations. Here are two adaptations of the ARB-TO procedure to increase convenience and extend student skills:

- **Replace Beads With 'Desk Dots'.** Teachers may want to use the student self-directed calm-down strategy represented by ARB-TO but also wish to avoid managing sets of beads or having emotionally upset students leave their seats to retrieve bead sets. A low-key adaptation of the ARB-TO is the substitution for the beads of a series of 10 dots numbered in descending order printed on a slip of paper and affixed to the student's desk. The student is then trained, when directed by the teacher, to apply the ARB-TO count-down/calm-down procedure using dots.

- **Train Students to Self-Manage Use of ARB-TO.** As students become familiar with, and comfortable using, Active Response Beads-Time Out, the teacher can give those students their own bead sets. Students would then be encouraged to monitor their own emotional states and use the beads (or Desk Dots) when needed as a calming device--without teacher prompting.

Reference

How To: Increase Motivation in Students: High-Probability Requests

Non-compliance is a frequent source of problem classroom behavior—driven by student attempts to escape or avoid challenging academic tasks (Packenham, Shute & Reid, 2004). For instance, when transitioning between educational activities a work-avoidant student may stall in beginning the next assignment. Or, during independent assignments, that same student may run out the clock by dawdling between work items. To increase compliance and work completion, teachers should identify strategies that prevent off-task behaviors but must also continue to hold students accountable for attaining rigorous academic standards.

High-probability requests are one feasible classroom technique that can be effective in motivating students to engage in assigned classwork (Lee, 2006). The teacher first identifies an academic activity in which the student historically shows a low probability of completing because of non-compliance. The teacher then embeds within that low-probability activity an introductory series of simple, brief 'high-probability' requests or tasks that this same student has an established track record of completing (Belfiore, Basile, & Lee, 2008).

As the student completes several embedded high-probability tasks in succession, he or she builds 'behavioral momentum' in responding that increases the likelihood that the student will apply full effort when encountering the 'main event'—the more challenging, low-probability activity. (See the table Use of High-Probability Requests to Increase Student Compliance: Examples from Research Studies for descriptions of how high-probability requests have been used successfully in school settings.)

Use of high-probability requests offers the twin advantages of motivating students while encouraging high academic standards. Students can find the experience of completing simple, high-probability tasks to be intrinsically reinforcing—which fuels the behavioral momentum that gives this strategy its power (Lee et al., 2004). At the same time, this approach offers teachers a means of holding non-compliant students to the same high academic expectations as their more cooperative classmates (Belfiore et al., 2008).

A potential instructional advantage of the high-probability request strategy should also be noted. Research suggests that student retention of learned material is heightened if that material is reviewed at intervals of several months or more from the initial learning (Pashler et al., 2007). If teachers are able to fold previously learned academic material (e.g., math computation) into a new lesson, they can offer the high-probability requests to help students make the transition between academic assignments. (See the table Use of High-Probability Requests to Increase Student Compliance: Examples from Research Studies for descriptions of how high-probability requests have been used successfully in school settings.)

Use of High-Probability Requests to Increase Student Compliance: Examples from Research Studies

Transitioning within academic tasks: Letter/word copying (Lee et al., 2004). During independent work, two 2nd-grade students were directed to copy a letter several times from a model (a preferred, high-probability task) before being asked to copy a whole word from a model (less-preferred, low-probability task).

Transitioning within academic tasks: Math computation (Lee et al., 2004). Three students with IEPs from intermediate grades were presented with flashcards containing math computation problems. The students were to read off and solve each problem, flip the card over to check the actual answer against their solution, and then advance to the next card. For the activity, the teacher first created a series of cards containing low-probability computation problems that were less-preferred because of their difficulty. Then, before each low-probability problem, the teacher inserted flashcards with three easy (more-preferred, high-probability) computation problems.

Transitioning between academic tasks: Independent math assignment (Wehby & Hollahan, 2000). This study focused on a middle-school student who often would not initiate independent math assignments. The teacher compiled a list of high-probability requests related to the independent math assignment that the student would typically respond to—e.g., 'write your name on the worksheet", "pick up your pencil", "take out a sheet of paper for the assignment", "look over the first problem". At the start of the independent seatwork activity, the teacher approached the student and randomly select and deliver 3 requests from the high-probability list. If the student ignored a request, the teacher would simply deliver another from the list until the student had successfully complied with 3 high-probability requests. Then the teacher delivered the less-preferred, low-probability request: "Begin your independent assignment."
computation facts; course vocabulary items) into high-probability requests, they can both boost student work
compliance and promote retention of essential skills or knowledge.

Here are more detailed teacher guidelines from Lee (2006) for embedding high-probability requests to build
behavioral momentum sufficient to motivate students to tackle less-preferred, low-probability academic activities:

1. **Identify incidents of non-compliant behavior.** The teacher notes academic work-situations that initially have a low
probability for completion because of student non-compliance (e.g., writing a journal entry; completing a
worksheet with reflective questions tied to a reading assignment). The teacher also determines whether non-
compliance in each situation occurs within that task or in transitioning to that task.

2. **List high-probability tasks.** Next, the teacher generates a list of high-probability tasks that the student is likely to
comply with. These tasks should be brief (i.e., take 5 seconds or fewer to complete) and should logically link to
the low-probability activity. For example, if the low-probability event is getting the student to start the writing of a
journal entry (transitioning between academic activities), easy, high-probability tasks associated with beginning
the writing task might include 'organize your writing materials', 'write a title', and 'list 3 ideas for the journal
entry'. If the low-probability event is having the student complete a worksheet with reflective questions tied to an
assigned reading (within-task), sample high-probability tasks associated with the worksheet could include
questions asking the student to 'copy the title of this reading', or 'write down one interesting vocabulary term from
the first paragraph'.

3. **Create activities with embedded high-probability tasks.** The teacher then reworks the low-probability work-
situation to embed within it a series of high-probability tasks. If the target is to get the student to transition
efficiently from one activity to another, the teacher inserts 3 high-probability requests at the start of the activity to
create behavioral momentum. If the goal is to prod the student to efficiently complete an independent
assignment without hesitating between items, the teacher inserts 3 high-probability requests before each
challenging item on the assignment.

4. **Introduce the activities.** The teacher rolls out the activities, now retooled to include embedded high-probability
tasks or requests. The teacher is careful, when presenting directives aloud to the student, to pace those
directives briskly: letting no more than 10 seconds elapse between student completion of one request and
teacher delivery of the next request. The teacher should also monitor the student's performance. If the student
does not comply quickly with selected high-probability requests, the teacher should replace those requests on
future assignments with others that elicit prompt compliance.

The guidelines offered here demonstrate how strategic use of high-probability requests can generate behavioral
momentum and prevent compliance problems with individual students. However, teachers may also be able to
creatively use high-probability sequences to motivate whole groups or even an entire class. For example, an
instructor might decide to intersperse 3 'easy' (high-probability) items between each 'challenge' item on a math
computation worksheet to be assigned to all students for independent seatwork. Or a teacher may routinely introduce
in-class writing assignments by first verbally directing students to 'take out paper and pen', 'write your name on the
paper', and 'copy this journal topic onto your paper'. The crucial factor in group use of high-probability sequences is
that the teacher accurately identify what tasks are indeed motivating and likely to build behavioral momentum among
the majority of students.

**References**


How To: Improve Reading Comprehension With a Cognitive Strategy: Ask-Read-Tell

Good reading comprehension requires that students monitor their understanding while reading a passage. At the point of performance—when a student picks up a text and prepares to read—there are 3 crucial phases that improve comprehension (Pressley & Wharton-McDonald, 1997): pre-reading (the reader creates a reading plan), reading (the reader monitors his or her understanding of the text while reading and applies strategies to clarify understanding of the text), and post-reading (the reader continues to think about the passage after reading and encode key details into long-term memory).

Poor readers often lack the skills to effectively monitor their comprehension of assigned passages and apply fix-up skills when needed. One means to help students to develop these self-monitoring skills is to teach them a cognitive strategy: ART: Ask-Read-Tell (McCallum et al., 2010). Whenever the student is assigned a challenging passage, he or she is trained to apply a 3-step ART sequence, which maps to the pre-reading/reading/post-reading timeline:

1. 
   **ASK**: Before reading the text, the student looks over the title of the passage, asks what the topic is likely to be, considers what he or she already knows about that topic, and generates 2 questions that the student hopes to answer through reading.

2. 
   **READ**: While reading, the student stops after each paragraph to query whether he or she has adequately understood that section of the passage and, if necessary, applies comprehension fix-up skills.

3. 
   **TELL**: After reading, the student attempts to answer the 2 questions posed earlier based on the content just read. Finally, the student meets with a peer partner, and participants tell each other what questions and answers they produced.

**Preparation.** In preparation for each ART session, the teacher:

- selects a challenging reading passage to be the focus of the ART comprehension strategy.
- provides each student with a copy of the **ASK-READ-TELL (ART): Student Worksheet** (attached).

**Procedures.** This intervention is student-directed. A full explanation of the ART steps can be found in the attached **ASK-READ-TELL (ART): Student Worksheet**.

When using the ASK-READ-TELL strategy, the teacher:

1. hands out the reading passage.
2. directs students to read the passage independently (either in-class or as a take-home assignment).
3. instructs students to complete the pre-reading, reading, and post-reading sections of the **ASK-READ-TELL (ART): Student Worksheet** as part of the reading assignment.
4. pairs students off after the assignment to compare the questions and answers that each generated from the assigned passage.
Training. The ASK-READ-TELL strategy is simple to use. However, the teacher should ensure that students are trained in the proper use of this strategy, beginning with teacher demonstration and moving to group practice with instructor feedback before students are directed to use ASK-READ-TELL independently.

References


ASK-READ-TELL (ART): Student Worksheet (McCallum et al., 2010)

Name: ___________________________ Passage/Page Numbers: _____________________ Date:__________

Directions: Use the checklist below to guide your reading of this passage. Check off each step when completed.

Step 1: Goal Before Reading: I look at the title of the passage and ASK myself these questions:

☐ What is the main topic of the passage? What does it discuss?

☐ What information do I already know about this topic?

Based on the title, what are two questions about this passage's topic that I would like to have answered in my reading?

1. ____________________________________________________________________________ ?

2. ____________________________________________________________________________ ?

Step 2: Goal While Reading: I READ the passage carefully for full understanding:

☐ While reading, I stop after each paragraph to ask, "Did I understand what I just read?"

☐ If I do understand the paragraph, I mark it with a plus sign (+) and continue reading.
   If I do not understand the paragraph, I mark it with a minus (-) sign and:
   - reread the paragraph;
   - slow my reading;
   - focus my full attention on what I am reading;
   - underline any words that I do not know and try to figure them out from the reading (context).

Step 3: Goal After Reading: I TELL what I learned from the passage:

☐ Based on my reading, here are answers to my two questions from Step 1:

1. ____________________________________________________________________________

2. ____________________________________________________________________________

☐ When I meet with my peer partner, we TELL each other what we learned from the passage, sharing our questions and answers. Then we talk about any other interesting information from the reading.
How To: Improve Student Self-Management Through Work-Planning Skills: Plan, Work, Evaluate, Adjust

It is no surprise to teachers that, when students have poor work-planning skills, their academic performance often suffers. Work-planning is the student's ability to inventory a collection of related sub-tasks to be done, set specific outcome goals that signify success on each sub-task, allocate time sufficient to carry out each sub-task, evaluate actual work performance, and make necessary adjustments in future work-planning as needed (Martin, Mithaug, Cox, Peterson, Van Dycke & Cash, 2003). When students are deficient as work planners, the negative impact can be seen on in-class and homework assignments as well as on longer-term projects such as research papers. Teachers can develop students' work-planning skills by training them in a simple but effective sequence: to plan upcoming work, complete the work, evaluate their work performance, and adjust their future work plans based on experience (Martin et al., 2003).

The vehicle for teachers to train students to develop strong work-planning skills is through conferencing: the teacher and student meet for a pre-work planning conference and then meet again after the work is completed at a self-evaluation conference. NOTE: The Student Independent Work: Planning Tool that appears later in this document is a graphic organizer that can be used to structure and record these 2-part teacher-student conferences.

**Phase 1: Work-Planning Conference**

Before the student begins the assigned academic work, the teacher meets with the student to develop the work plan. (While the teacher often initially assumes a guiding role in the work-planning conference, the instructor gradually transfers responsibility for developing the plan to the student as that student's capacity for planning grows.)

There are 3 sections in the work-planning conference: (1) inventory the sub-tasks to be done, (2) assign an estimated time for completion, and (3) set a performance goal for each item on the task list:

1. **Inventory the sub-tasks to be done.** The student describes each academic task in clear and specific terms (e.g., "Complete first 10 problems on page 48 of math book", "write an outline from notes for history essay"). For this part of the work plan, the teacher may need to model for the student how to divide larger global assignments into component tasks.

2. **Assign an estimated time for completion.** The student decides how much time should be reserved to complete each task (e.g., For a math workbook assignment: "20 minutes" or "11:20 to 11:40"). Because students with limited planning skills can make unrealistic time projections for task completion, the teacher may need to provide additional guidance and modeling in time estimation during the first few planning sessions.

3. **Set a performance goal.** The student sets a performance goal to be achieved for each sub-task. Performance goals are dependent on the student and may reference the amount, accuracy, and/or qualitative ratings of the work: (e.g., for a reading assignment: "To read at least 5 pages from assigned text, and to take notes of the content"; for a math assignment: "At least 80% of problems correct"; for a writing assignment: "Rating of 4 or higher on class writing rubric"). The teacher can assist the student to set specific, achievable goals based on that student's current abilities and classroom curriculum expectations.
Phase 2: Self-Evaluation Conference

When the work has been completed, the teacher and student meet again to evaluate the student's performance. There are 2 sections to this conference: (1) Compare the student's actual performance to the original student goal; and (2) adjust future expectations and performance in light of the experience gained from the recently completed work.

1. Compare the student's actual performance to the original student goal. For each sub-task on the plan, the student compares his or her actual work performance to the original performance goal and notes whether the goal was achieved. In addition to noting whether the performance goal was attained, the student evaluates whether the sub-task was completed within the time allocated.

2. Adjust future expectations and performance. For each sub-task that the student failed to reach the performance goal within the time allocated, the student reflects on the experience and decides what adjustments to make on future assignments. For example, a student reviewing a homework work-plan who discovers that she reserved insufficient time to complete math word problems may state that, in future, she should allocate at least 30 minutes for similar sub-tasks. Or a student who exceeds his performance goal of no more than 4 misspellings in a writing assignment may decide in future to keep a dictionary handy to check the spelling of questionable words before turning in writing assignments.

References

# Student Independent Work: Planning Tool

**Student:** ________________________________  **Teacher/Staff Member:** __________________________  **Date:** ___/___/___

<table>
<thead>
<tr>
<th>Date</th>
<th>Planning</th>
<th>Planning</th>
<th>Planning</th>
<th>Self-Evaluation</th>
<th>Self-Evaluation</th>
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<tbody>
<tr>
<td></td>
<td>Sub-Task: Describe each assignment sub-task to be completed.</td>
<td>Time Allocated: Estimate the time required for this task. E.g., &quot;20 mins&quot;; &quot;11:20-11:40&quot;</td>
<td>Performance Goal: Write your goal for the amount, accuracy, and/or quality of work to be completed.</td>
<td>Actual Performance: After the assignment, record the amount, accuracy, and/or quality of the work actually completed.</td>
<td>Goal Met?: Did you achieve the goal within the time allocated?</td>
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**Adjustment:** Find any 'NO' responses in the Goal Met? column. In the space below, write the number of that goal and your plan to improve on that goal next time.

- Number of Goal Not Met & Action Plan to Fix: __________
- Number of Goal Not Met & Action Plan to Fix: __________
- Number of Goal Not Met & Action Plan to Fix: __________
How To: Help Students to Complete Missing Work: The Late-Work Teacher-Student Conference

When students fall behind in classwork and homework, they can quickly enter a downward spiral. They must stay caught up in their current assignments—but must also submit overdue assignments. As the work piles up, some students become overwhelmed and simply give up.

The reasons that students fall behind in assignments are many. Students who are just developing homework skills, for example, often need more time than peers to complete independent assignments, can find it challenging to focus their attention when working on their own, and may not have efficient study skills (Cooper & Valentine, 2001). To be sure, student procrastination and avoidance in work assignments is a widespread problem. And many students who fall behind in their work also develop a maladaptive, self-reinforcing pattern of escape-maintained behavior: as these students owe ever-increasing amounts of late work, they respond to the anxiety generated by that overhang of overdue assignments by actively avoiding that work. And thus the problem only grows worse (Hawkins & Axelrod, 2008).

When a student begins to slip in the completion and submission of assignments, the teacher can take steps proactively to interrupt this work-avoidant pattern of behavior by meeting with the student to create a plan to catch up with late work. (It is also recommended that the parent attend such a conference, although parent participation is not required.) In this 'late-work' conference, the teacher and student inventory what work is missing, negotiate a plan to complete that overdue work, and perhaps agree on a reasonable penalty for any late work turned in. Teacher, student (and parent, if attending) then sign off on the work plan. The teacher also ensures that the atmosphere at the meeting is supportive, rather than blaming, toward the student. And of course, any work plan hammered out at this meeting should seem attainable to the student.

Below in greater detail are the steps that the teacher and student would follow at a meeting to renegotiate missing work. (NOTE: Teachers can use the Student Late-Work Planning Form: Middle & High School that appears later in this document to organize and document these late-work conferences.):

1. **Inventory All Missing Work.** The teacher reviews with the student all late or missing work. The student is given the opportunity to explain why the work has not yet been submitted.

2. **Negotiate a Plan to Complete Missing Work.** The teacher and student create a log with entries for all of the missing assignments. Each entry includes a description of the missing assignment and a due date by which the student pledges to submit that work. This log becomes the student’s work plan. It is important that the submission dates for late assignments be realistic—particularly for students who owe a considerable amount of late work and are also trying to keep caught up with current assignments. A teacher and student may agree, for example, that the student will have two weeks to complete and submit four late writing assignments. NOTE: Review the that appears later in this handout as a tool to organize and document the student’s work plan.

3. **[Optional] Impose a Penalty for Missing Work.** The teacher may decide to impose a penalty for the work being submitted late. Examples of possible penalties are a reduction of points (e.g., loss of 10 points per assignment) or the requirement that the student do additional work on the assignment than was required of his or her peers who turned it in on time. If imposed, such penalties would be spelled out at this teacher-student conference. If penalties are given, they should be balanced and fair, permitting the teacher to impose appropriate
consequences while allowing the student to still see a path to completing the missing work and passing the course.

4. **Periodically Check on the Status of the Missing-Work Plan.** If the schedule agreed upon by teacher and student to complete and submit all late work exceeds two weeks, the teacher (or other designated school contact, such as a counselor) should meet with the student weekly while the plan is in effect. At these meetings, the teacher checks in with the student to verify that he or she is attaining the plan milestones on time and still expects to meet the submission deadlines agreed upon. If obstacles to emerge, the teacher and student engage in problem-solving to resolve them.

**References**


Student Late-Work Planning Form: Middle & High School

Teacher: ______________________________ Course: ______________________________

Student: ______________________________ Date: _________/ _____/___________________

Directions: At a teacher-student conference, use this form to create a plan for the student to complete and submit missing or late work.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Target Date for Completion</th>
<th>NOTES</th>
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What penalty--if any--will be imposed for these late assignments? _____________________________________________

_______________________________________________________________________________________

_____________________
Student Signature

_____________________
Teacher Signature

_____________________
Parent Signature
How To: Set Off-Level Academic Goals for Reading Fluency

Students with significant deficits in reading fluency can present particular challenges as teachers attempt to match them to appropriate academic interventions. Often, these more intensive interventions are ‘off-level’; that is, they target academic skills that are well below the student’s grade placement.

If that student has significant academic delays, it might be a mistake, however, to measure the student using only assessments from the student’s grade of record. The problem with monitoring the progress of an off-level student using only assessments from the current grade level is that these assessments could prove so difficult that they fail to show the true gains that the student is making on the off-level intervention. For students with significant academic delays, then, the school must follow sensible and consistent guidelines for matching those students to appropriate supplemental off-level interventions, for setting performance goals, and for measuring their academic progress that will both benefit the student and accurately reflect actual student growth.

The remainder of this article describes how the formulation of academic goals in reading fluency for students who receive 'off-level' supplemental interventions will always contain the four universal goal-setting elements described above—but includes special instructions for estimating typical peer performance and expected weekly progress for this group.

Below is a 6-step process adapted from Shapiro (2008) for finding the optimal 'off-level' grade for monitoring a student with substantial reading fluency delays, for setting progress-monitoring goals for that student, and for adjusting periodically the student's intervention and monitoring to reflect growth in student skills:

1. Obtain Research-Derived Academic Screening Norms With Percentile Cut-Points. The process of finding a student’s appropriate off-level placement in academic intervention begins with the school selecting a set of research-derived academic screening norms. These norms should include values for fall, winter, and spring of each grade and should be broken down into percentile cut-offs (e.g., norms at the 10th percentile, 25th percentile, 50th percentile, etc.). Commercially available screening packages such as AIMSweb (http://www.aimsweb.com) provide such norms. Or schools can go to other sources to obtain research norms with percentile cut-points for reading fluency (e.g., Tindal & Hasbrouck, 2005; EasyCBM, 2010) and additional academic areas (e.g., EasyCBM, 2010).

   Case Example: Mrs. Chandler is a 4th-grade teacher in a school whose district has adopted AIMSweb literacy screening tools. The district selected AIMSweb in part because the product includes national norms spanning elementary and middle-school grades that are divided into percentile cut-offs at each grade level.

2. Determine Cut-Points on Research Norms That Indicate Optimal Instructional Placement. Research norms with percentile cut-offs are essential for deciding a student’s appropriate instructional match for supplemental intervention. When reviewing its research-derived screening norms, the school sets percentile cut-offs that designate appropriate instructional placement and mastery at each grade level. Shapiro (2008) recommends that, when consulting research norms at any grade level:

   - the 25th percentile serve as the cut-point for determining that a student has the minimum academic skills needed to experience success in that material. (Please note, though, that norms from other popular academic screening tools –e.g., easyCBM.com—set the 20th percentile as the minimum-skills cut-point.)
• the 50th percentile should serve as the cut-point for defining that the student has attained ‘mastery’ on the grade-level academic skill.

Case Example: Using the AIMSweb norms, Mrs. Chandler’s school decides that when assessed on literacy screening tools at any grade level, a student will be considered as falling within the instructional range if he or she performs within the 25th to 49th percentile and as having achieved mastery if he or she performs at or above the 50th percentile.

3. Find the Target Student’s Optimal ’Off-Level’ Instructional Match Through a ‘Survey-Level’ Assessment.
The school must next find the struggling student’s appropriate ‘instructional match’—the level of task difficulty that will allow the student to experience sufficient success on off-level interventions while also ensuring a monitoring plan that can accurately track the student’s true growth on that intervention. The process used to find the student’s instructional match is called a ‘survey-level’ assessment.

The school administers to the target student a series of standardized curriculum-based measures (CBMs) in the area of academic concern. These CBMs start at the level of the student’s current grade placement and work downward, testing the student at successively earlier grade levels.

For each grade-level CBM administered, the teacher scores that ‘off-level’ CBM and compares the student results to research norms.

• If the student performs at or above the 25th percentile with materials drawn from a particular ‘off-level’ grade, the teacher judges that the student is likely to experience a good match using intervention and assessment materials at this grade level—and the Survey Level Assessment ends here.

• However, if the student performs below the 25th percentile, it is judged that material at that lower, ‘off-level’ grade is too challenging for use in monitoring the student’s progress on intervention. The teacher instead continues to administer CBMs from successively earlier grade levels, stopping only at the grade-level at which the student performs at or above the 25th percentile according to the research norms.

Case Example: In January, Mrs. Chandler reviews her classwide reading fluency screening results. She notes that a student who has recently transferred to her classroom, Randy, performed at 35 Words Read Correct (WRC) on the 1-minute AIMSweb Grade 4 fluency probes.

Mrs. Chandler consults AIMSweb reading-fluency research norms and finds that a reasonable minimum reading rate for students by winter of grade 4 (25th percentile) is 89 WRC. Because Randy’s reading fluency rate is so far below the grade-level norms (a gap of 54 WRC), his teacher decides to conduct a Survey Level Assessment to find the student’s optimal grade level placement for supplemental reading instruction.

• On Grade 3-level probes, Randy attains a median score of 48 WRC. The AIMSweb winter norm (25th percentile) for a 3rd grade student is 69 WRC. The student is still in the ‘frustration’ range and the Survey Level Assessment continues.

• On Grade 2-level probes, Randy attains a median score of 64 WRC. The AIMSweb winter norm (25th percentile) for a 2nd grade student is 53 WRC. Because Randy’s Grade 2 WRC score exceeds the 25th percentile cut-point, the student is now in the ‘instructional’ range and the Survey Level Assessment ends.
4. **Determine an 'Off-Level' Progress-Monitoring Goal Based on Norms.** To set an intervention progress-monitoring goal, the teacher looks up and uses the academic performance norm for the 50th percentile at the student’s off-level ‘instructional’ grade level previously determined through the Survey Level Assessment.

   **Case Example:** To find the progress-monitoring goal for Randy, his teacher Mrs. Chandler looks up the benchmark Words Read Correct (WRC) for the 50th percentile on the winter screening norms at Grade 2 (Randy’s off-level ‘instructional’ grade level)—which is 79 WRC. This becomes the progress-monitoring goal for the student.

5. **Translate the Student’s Long-Term Progress-Monitoring Goal into Weekly Increments.** The teacher’s final task before beginning to monitor the student's progress on intervention is to translate the student’s ultimate intervention goal into ‘ambitious but realistic’ weekly increments. A useful method (Shapiro, 2008) for determining weekly growth rates is to start with research-derived growth norms and to then use a ‘multiplier’ to make the expected rate of weekly growth more ambitious.

   The teacher first looks up the average rate of weekly student growth supplied in the research norms.

   - If available, a good rule of thumb is to use the growth norms for the 50th percentile at the ‘off-level’ grade at which the student is receiving intervention and being monitored.

   - If a screening tool's academic-performance norms do not also include growth norms, schools can compute the 'typical' rate of weekly progress for any grade-level by (1) subtracting the fall screening results (50th percentile) for the off-level grade from the spring screening results (50th percentile) and (2) dividing the difference by 32—representing the typical 32 weeks that separate fall and spring screenings in most schools. The resulting quotient represents 'average' expected rate of student progress per instructional week on that academic screening measure at that grade level.

   The teacher then multiplies this grade norm for weekly growth by a multiplier whose value falls between 1.5 and 2.0 (Shapiro, 2008). Because the original weekly growth rate represents only a typical rate of academic improvement, this multiplier is used to boost the target student’s weekly growth estimate to a point at which learning is accelerated and the gap separating that student from peers will likely close if the intervention is successful.

   **Case Example:** Randy, the 4th-grade student, is to be monitored on intervention at grade 2. Mrs. Chandler finds—using AIMSweb norms—that a typical student in Grade 2 (at the 50th percentile) has a rate of improvement of 1.1 Words Read Correct (WRC) per week. Based on her own judgment, Mrs. Chandler selects 1.8 as her multiplier—although any figure between 1.5 and 2.0 would be acceptable. She multiplies the 1.1 WRC figure by 1.8 to obtain an ambitious weekly growth goal for Randy of about 2.0 additional WRCs.

   Randy’s ultimate ‘graduation goal’ that would allow him to advance beyond grade 2 as his supplemental intervention level is 79 WRC (the 50th percentile norm for grade 2). During the Survey Level Assessment, Randy was found to read 64 WRC at the 2nd grade level. There is a 15-WRC gap to be closed to get Randy to his goal. At a growth rate of 2 additional WRC per week during the intervention, Randy should close the gap within about 8 instructional weeks.
6. **Advance the Student to Higher Grade Levels for Intervention & Progress-Monitoring.** The teacher monitors the student’s growth in the target academic skill at least once per week (twice per week is ideal). When, according to the research norms for his or her off-level grade, the student’s performance exceeds the 50th percentile, this triggers a teacher reassessment of the student’s academic skills at the next higher grade, again using the research-based norms. If the student performs at or above the 25th percentile on probes from that next grade level, the teacher can move the student up with confidence and begin to monitor at the higher grade level. The process repeats until the student eventually closes the gap with peers and is being monitored at grade of placement.

*Case Example:* His teacher, Ms. Chandler, notes that after 7 weeks of intervention, Randy is now reading 82 Words Read Correct (WRC)—exceeding the 79 WRC for the 50th percentile of students in Grade 2 (winter norms). So Mrs. Chandler assesses Randy on AIMSweb reading fluency probes for Grade 3 and finds that he reads on average 72 WRC —exceeding the 3rd grade 25th percentile cut-off of 69 WRC. Therefore, Randy is advanced to Grade 3 progress-monitoring and his intervention materials are adjusted accordingly.

**Recommendations for using this approach:** Research norms for student performance and academic growth are the ‘gold standard’ in off-level goal-setting, as they provide fixed, external standards for proficiency that are not influenced by variable levels of student skill in local classrooms. When setting academic goals for struggling students, schools should use research norms whenever they are available. In particular, research norms should be used for high-stakes RTI cases that may be referred at some point to the Special Education Eligibility Team.

**References**


Curriculum-Based Measurement: Reading

**CBM-Oral Reading Fluency** assesses general reading performance, as well as reading speed. In an oral reading fluency assessment, the student reads aloud from a passage for 1 minute. The reading sample is scored for words read correctly (WRC) and errors.

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Source: AimsWeb National Norms Table. (2007).
How To: Measure Letter Knowledge With CBM: Letter Name Fluency (LNF) & Letter Sound Fluency (LSF)

Teachers have always known that letter knowledge is a pre-requisite to the acquisition of reading skills. Before students can decode text, they must be fluent in recognizing both letters and their sounds. And recent research confirms that children's ability in primary grades to identify letter names and sounds is a strong predictor of reading readiness and future reading success (Ritchey & Speece, 2006).

Efficient, curriculum-based assessments to track student performance and growth in letter knowledge are Letter Name Fluency (LNF) and Letter Sound Fluency (LSF). In each assessment, the teacher administers timed 1-minute fluency probes (assessments) to children and compares the results to research norms to determine whether students are under-performing and therefore at risk for future academic problems. These two measures are time-efficient and the perfect means to track a student's progress in letter-skills instruction or intervention.

CBM-Letter Name Fluency/Letter Sound Fluency: How to Access Resources. Teachers seeking to screen their students in foundation letter-knowledge skills can obtain these free CBM-LNF/LSF assessment resources: (1) materials for assessment, (2) guidelines for administration and scoring, and (3) research-based norms.

- Materials for assessment. Schools can create free mixed-case random-letter lists by accessing the Letter Fluency Generator, an online application: http://www.interventioncentral.org/teacher-resources/letter-name-fluency-generator
- Guidelines for administration and scoring. Instructions for preparing, administering, and scoring CBM-Letter Name Fluency/Letter Sound Fluency assessments appear later in this document:
- Research-based norms. Two tables, Curriculum-Based Measurement: Letter Name Fluency (LNF) and Curriculum-Based Measurement: Letter Sound Fluency (LSF), are included in this document. The norms include fluency benchmarks and growth norms for grades K-2 (Riverside, 2013).

References

Curriculum-Based Measurement-Letter Name Fluency (LNF)/Letter Sound Fluency (LSF): Guidelines for Use

CBM-LNF/LSF: Description

In the CBM-Letter Name Fluency (LNF) task, the student is given a random list of upper- and lower-case letters and has 1 minute to identify the names of as many letters as possible.

In the CBM-Letter Sound Fluency (LSF) task, the student is given a random list of upper- and lower-case letters and has 1 minute to identify as many letter sounds as possible.

Directions for Letter Name Fluency: LNF

CBM-Letter Name Fluency: Materials
The following materials are needed to administer CBM-LNF probes:
- Student and examiner copies of random list of upper- and lower-case letters
- Stopwatch

CBM-Letter Name Fluency: Preparation
Schools can create free mixed-case random-letter lists by accessing the Letter Fluency Generator, an online application:
http://www.interventioncentral.org/teacher-resources/letter-name-fluency-generator

CBM-Letter Name Fluency: Directions for Administration (adapted from Hosp, Hosp, & Howell, 2007; Ritchey & Speece, 2006)

1. The examiner sits at a table with the student and gives the student a copy of the randomized letter list.
2. The examiner says: "This list contains letters in mixed-up order. When I say 'begin', read the name of each letter aloud, starting from here [the examiner points to the top left of the page]. Read each letter as I point to it. Try your best and keep reading until I tell you to stop.
3. The examiner says: "Begin", starts the stop-watch, and points to the first letter.
4. As the student reads a letter correctly, the examiner immediately points to the next letter. If the student misreads a letter or hesitates for 3 seconds or longer, the examiner points to the next letter. The examiner does not correct student mistakes or provide the correct letter when the student hesitates.
5. At the end of 1 minute, the examiner stops the stop-watch, says: "Stop", and collects and scores the student letter list.
6. Initial Assessment: If the examiner is assessing the student for the first time, the examiner administers a total of 3 letter lists during the session using the above procedures and takes the median (middle) score as the best estimate of the student's letter naming speed.
   Progress-Monitoring: If the examiner is monitoring student growth in letter-naming (and has previously collected LNF data), only one letter list is given in the session.

CBM-Letter Name Fluency: Practice

If the student is not yet familiar with the LNF task, the teacher can administer one or more practice LNF probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.
CBM-Letter Name Fluency: Scoring Guidelines

The examiner adds up the total number of correct responses, giving the student credit for each correct letter name. The student does not receive credit for letter sounds or for giving correct letter-name responses after hesitations of 3 seconds or longer.

Directions for Letter Sound Fluency: LSF

CBM-Letter Sound Fluency: Materials
The following materials are needed to administer CBM-LSF probes:
- Student and examiner copies of random list of lower-case letters
- Stopwatch

CBM-Letter Sound Fluency: Preparation
Schools can create free lower-case random-letter lists by accessing the Letter Fluency Generator, an online application:
http://www.interventioncentral.org/teacher-resources/letter-name-fluency-generator

CBM-Letter Sound Fluency: Directions for Administration (adapted from Fuchs & Fuchs, n.d.; Hosp, Hosp, & Howell, 2007; Ritchey & Speece, 2006)

1. The examiner sits at a table with the student and gives the student a copy of the randomized letter list.
2. The examiner says: "This list contains letters in mixed-up order. When I say 'begin', say the sound of each letter aloud, starting from here [the examiner points to the top left of the page]. Give the sound of each letter as I point to it. Try your best and keep going until I tell you to stop.
3. The examiner says: "Begin", starts the stop-watch, and points to the first letter.
4. As the student gives a correct letter sound, the examiner immediately points to the next letter. If the student gives an incorrect letter sound or hesitates for 3 seconds or longer, the examiner points to the next letter. The examiner does not correct student mistakes or provide the correct letter sound when the student hesitates.
5. At the end of 1 minute, the examiner stops the stop-watch, says: "Stop", and collects and scores the student letter list.
6. Initial Assessment: If the examiner is assessing the student for the first time, the examiner administers a total of 3 letter lists using the above procedures and takes the median (middle) score as the best estimate of the student’s letter sound fluency.
   Progress-Monitoring: If the examiner is monitoring student growth in letter-sound fluency (and has previously collected LSF data), only one letter list is given.

CBM-Letter Sound Fluency: Practice
If the student is not yet familiar with the LSF task, the teacher can administer one or more practice LSF probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

CBM-Letter Sound Fluency: Scoring Guidelines

The examiner adds up the total number of correct responses, giving the student credit for each correct letter sound. Both hard and soft sounds for ‘c’ and ‘g’ are acceptable. Only the short version of vowel sounds are acceptable (Fuchs & Fuchs, n.d.).
References


### Curriculum-Based Measurement: Letter Name Fluency (LNF) Norms

(Riverside, 2013)*

In the CBM-Letter Name Fluency (LNF) task, the student is given a random list of upper- and lower-case letters and has 1 minute to identify the names of as many letters as possible.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentile</th>
<th>Fall LNF (Riverside, 2013)</th>
<th>Winter LNF (Riverside, 2013)</th>
<th>Spring LNF (Riverside, 2013)</th>
<th>Weekly Growth (Calculated across 32 Instructional Wks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>50%ile</td>
<td>19</td>
<td>35</td>
<td>45</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>20%ile</td>
<td>5</td>
<td>22</td>
<td>36</td>
<td>0.97</td>
</tr>
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<td>2</td>
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<td>0.84</td>
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<tr>
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<td>56</td>
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<td>0.88</td>
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<td>20%ile</td>
<td>28</td>
<td>42</td>
<td>49</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td>10%ile</td>
<td>20</td>
<td>34</td>
<td>42</td>
<td>0.69</td>
</tr>
</tbody>
</table>

### Curriculum-Based Measurement: Letter Sound Fluency (LSF) Norms

(Riverside, 2013)*

In the CBM-Letter Sound Fluency (LSF) task, the student is given a random list of upper- and lower-case letters and has 1 minute to identify as many letter sounds as possible.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentile</th>
<th>Fall LSF (Riverside, 2013)</th>
<th>Winter LSF (Riverside, 2013)</th>
<th>Spring LSF (Riverside, 2013)</th>
<th>Weekly Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>50%ile</td>
<td>4</td>
<td>22</td>
<td>35</td>
<td>0.97</td>
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<tr>
<td></td>
<td>20%ile</td>
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<td>0</td>
<td>5</td>
<td>16</td>
<td>0.50</td>
</tr>
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<td>46</td>
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<tr>
<td></td>
<td>20%ile</td>
<td>18</td>
<td>31</td>
<td>36</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>10%ile</td>
<td>12</td>
<td>27</td>
<td>30</td>
<td>0.56</td>
</tr>
</tbody>
</table>

**References:**

*Reported Characteristics of Student Sample(s) Used to Compile These Norms:
- Riverside, 2013: Number of Students Assessed: "An average of 12,000 students per test" (Riverside, 2013; p. 3)/Geographical Location: Nationwide/Socioeconomic Status: Not reported/Ethnicity of Sample: Not reported/Limited English Proficiency in Sample: Not reported.*
Where to Find Materials: Schools can create free random-letter lists by accessing the Letter Fluency Generator, an online application: [http://www.interventioncentral.org/teacher-resources/letter-name-fluency-generator](http://www.interventioncentral.org/teacher-resources/letter-name-fluency-generator)
How To: Assess Reading Speed With CBM: Oral Reading Fluency Passages

A student's accuracy and speed in reading aloud is an obvious and readily observable indicator of that student's reading ability. Reading fluency is an essential component of a student's global reading skills (National Institute of Child Health and Human Development, 2000). Furthermore, up through grade 3, reading fluency is arguably the best predictor of future reading success (Hosp, Hosp, & Howell, 2007).

The curriculum-based measure to track student reading speed is termed Oral Reading Fluency (ORF). In CBM-ORF, the student is given a grade-appropriate passage and asked to read aloud for one minute. The examiner marks as incorrect any words that the student misreads or hesitates on for 3 seconds or longer. The passage is then scored for Correctly Read Words (CRW). Although CBM-ORF is simple in format and quick to administer, its results are sensitive to short-term student gains in reading skills and predictive of long-term reading success, making this assessment an ideal progress-monitoring tool for classroom use.

CBM-ORF: How to Access Resources. Teachers can access a toolkit of resources for CBM-ORF, including: (1) materials for assessment, (2) guidelines for administration and scoring, and (3) research-based norms.

- **Materials for assessment.** DIBELS NEXT: Here are 3 sources for free CBM-ORF materials:
  
  DIBELS NEXT: Schools can obtain free ORF passages and ORF benchmarks for grades 1-6 from the DIBELS Next website: http://dibels.org/next.html

  EasyCBM: The easyCBM website (http://easycbm.com/) has collections of CBM-ORF passages (referred to as 'Passage Fluency') for grades 1-8. Teachers can create a free account on this website to access materials and benchmarks.

  Schools can also make their own CBM Oral Reading Fluency passages in PDF format based on text typed in by the user using the Reading Fluency Passages Generator, a free online application: http://www.interventioncentral.org/teacher-resources/oral-reading-fluency-passages-generator

- **Guidelines for administration and scoring.** Instructions for preparing, administering, and scoring CBM-ORF assessments appear later in this document:

- **Research-based norms.** A table, *Curriculum-Based Measurement: Oral Reading Fluency Norms*, is included in this document. The norms include fluency benchmarks for grades 1-8 and accompanying growth norms (Hasbrouck & Tindal, 2005).

References


Curriculum-Based Measurement-Oral Reading Fluency (ORF): Guidelines for Use

CBM-ORF: Description
CBM-ORF measures a student's reading fluency by having that student read aloud for 1 minute from a prepared passage. During the student's reading, the examiner makes note of any reading errors in the passage. Then the examiner scores the passage by calculating the number of words read correctly.

CBM-ORF: Materials
The following materials are needed to administer a CBM-ORF passage:

- Student and examiner copies of a CBM-ORF passage (the process for creating ORF passages is described below)
- Stopwatch

CBM-ORF: Preparation
When assessing a student's Oral Reading Fluency skills, the examiner chooses 3 grade-appropriate passages. For children in the 1st and 2nd grades, each passage should be at least 150 words long, while passages of at least 250 words should be prepared for older students. Passages selected should not contain too much dialog and should avoid an excessive number of foreign words or phrases. In addition, only prose passages should be used in CBM assessments. Poetry and drama should be avoided because they tend to vary considerably and do not represent the kind of text typically encountered by students.

For ease of administration, the instructor will want to prepare examiner and student copies of each passage. Ideally, reading passages should be free of illustrations that may help a child to interpret the content of the text. The examiner copy should have a cumulative word total listed along the right margin of the passage for ease of scoring (see Figure 1).

It is strongly recommended that teachers use existing collections of well-constructed, reading passages organized by grade-level when conducting Oral Reading Fluency assessments. Here are 3 sources for free CBM-ORF materials:

- DIBELS NEXT: Schools can obtain free ORF passages and ORF benchmark norms for grades 1-6 from the DIBELS Next website: http://dibels.org/next.html

---

Figure 1: Example of CBM Oral Reading Fluency Probe

<table>
<thead>
<tr>
<th>Examiner Copy</th>
<th>Student Copy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summertime! How lovely it was in the country, with the wheat standing yellow, the oats green, and the hay all stacked down in the grassy meadows! And there went the stork on his long red legs, chattering away in Egyptian, for he had learned that language from his mother. The fields and</td>
<td>Summertime! How lovely it was in the country, with the wheat standing yellow, the oats green, and the hay all stacked down in the grassy meadows! And there went the stork on his long red legs, chattering away in Egyptian, for he had learned that language from his mother. The fields and</td>
</tr>
</tbody>
</table>
EasyCBM: The easyCBM website (http://easycbm.com/) has collections of CBM-ORF passages (referred to as 'Passage Fluency') for grades 1-8. Teachers can create a free account on this website to access materials and benchmark norms.

Schools can also make their own CBM Oral Reading Fluency passages in PDF format based on text typed in by the user using the Reading Fluency Passages Generator, a free online application: http://www.interventioncentral.org/teacher-resources/oral-reading-fluency-passages-generator

CBM-ORF: Directions for Administration (Hosp, Hosp, & Howell, 2007; Wright, 2007)
1. The examiner and the student sit across the table from each other. The examiner hands the student the unnumbered copy of the CBM reading passage. The examiner takes the numbered copy of the passage, shielding it from the student's view.
2. The examiner says to the student: "When I say, 'begin', start reading aloud at the top of this page. Read across the page [demonstrate by pointing]. Try to read each word. If you come to a word you don't know, I'll tell it to you. Be sure to do your best reading. Are there any questions? [Pause] Begin."
3. The examiner starts the stopwatch when the student says the first word. If the student does not say the initial word within 3 seconds, the examiner says the word and starts the stopwatch.
4. As the student reads along in the text, the examiner records any errors by marking a slash (/) through the incorrectly read word. If the student hesitates for 3 seconds on any word, the examiner says the word and marks it as an error.
5. At the end of 1 minute, the examiner says, "Stop" and marks the student's concluding place in the text with a bracket ( ]).
6. Initial Assessment: If the examiner is assessing the student for the first time, the examiner administers a total of 3 reading passages during the session using the above procedures and takes the median (middle) score as the best estimate of the student's oral reading fluency.
   Progress-Monitoring: If the examiner is monitoring student growth in oral reading fluency (and has previously collected ORF data), only one reading passage is given in the session.

CBM-ORF: Directions for Practice

If the student is not yet familiar with CBM-Oral Reading Fluency probes, the teacher can administer one or more practice ORF probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

CBM-ORF: Scoring Guidelines

Reading fluency is calculated by first determining the total words attempted within the timed reading probe and then deducting from that total the number of incorrectly read words.

The following scoring rules will aid the instructor in marking the reading probe:
- Words read correctly are scored as correct.
- Self-corrected words are counted as correct.
- Repetitions are counted as correct.
- Examples of dialectical speech are counted as correct.
- Inserted words are ignored.
- Words read to the student by the examiner after 3 seconds are counted as errors.
- Mispronunciations are counted as errors.

Example
Text: The small gray fox ran to the cover of the trees.
Student: "The small gray fox ran to the cover of the trees."

- Substitutions are counted as errors.
  Example
  Text: When she returned to the house, Grandmother called for Franchesca.
  Student: "When she returned to the home, Grandmother called for Franchesca."

- Omissions are counted as errors.
  Example
  Text: Anna could not compete in the last race.
  Student: "Anna could not in the last race."

- Transpositions of word-pairs are counted as a single error.
  Example
  Text: She looked at the bright, shining face of the sun.
  Student: "She looked at the shining, bright face of the sun."

**Computing reading-fluency rate in a single passage**

The scoring of a reading probe is straightforward. The examiner first determines how many words the reader actually attempted during the 1-minute reading sample. On the completed probe in Figure 2, for instance, the bracket near the end of the text indicates that the student attempted 48 words before his time expired. Next, the examiner counts up the number of errors made by the reader. On this probe, the student committed 4 errors. By deducting the number of errors from the total words attempted, the examiner arrives at the number of correctly read words per minute. This number serves as an estimate of reading fluency, combining as it does the student's speed and accuracy in reading. So by deducting the errors from total words attempted, we find that the child actually read 44 correct words in 1 minute.

Accommodating omissions when scoring...

When a student skips several connected words or even an entire line during a reading probe, that omission creates a special scoring dilemma. An omission, after all, is considered to be a single error of tracking, no matter how many words were skipped at one time. However, if all words omitted in a line were individually counted as errors, the student's error rate would be greatly inflated. The solution is for the examiner to subtract all but one of the words in each omission before computing the total words attempted.

Let's see how that score adjustment would work. On the completed probe in Figure 3, the student omitted the text of an entire line while reading aloud. The examiner drew a line through all the connected words skipped by the child in that omitted line of text. Because a total of 11 words were omitted, the examiner drops 10 of those words before calculating the total words attempted.
When calculating the number of words the child attempted to read, the examiner notes that the child reached word 48 in the passage. Ten words are then deducted from the omitted lines to avoid inflating the error count. The adjusted figure for total words attempted is found to be 38 words. The child committed 5 errors (4 marked by slashes and 1 omission). These errors are subtracted from the revised figure of 38 total words attempted. Therefore, the number of correctly read words in this example would be 33.

Figure 3: A reading probe marked for words omitted

| Summertime! How lovely it was in the country, with | 9 |
| the wheat standing yellow, the oats green, and the hay all | 20 |
| stacked down in the grassy meadows! And there went the stork | 31 |
| on his long red legs, chattering away in Egyptian, for | 41 |
| he had learned that language from his mother. The fields and | 52 |
| | |

Original Total Read Words = 48

Omission Error: 10 of 11 omitted words deducted from Total Read Words

Adjusted Total Read Words = 38
Minus 5 errors
Equals 33 Correctly Read Words

References


Curriculum-Based Measurement: Oral Reading Fluency Norms (Hasbrouck & Tindal, 2005)*

CBM-Oral Reading Fluency assesses general reading performance (Espin et al., 2010), as well as reading speed. In an oral reading fluency assessment, the student reads aloud from a passage for 1 minute. The reading sample is scored for words read correctly (WRC) and errors.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>23</td>
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<td></td>
</tr>
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<td>1.0</td>
<td></td>
</tr>
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</tr>
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<td>84</td>
<td>97</td>
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</tbody>
</table>
### References:

### *Reported Characteristics of Student Sample(s) Used to Compile These Norms:*
- Hasbrouck & Tindal, 2005:  
  - **Number of Students Assessed:** 88167 students in fall norming; 97237 students in winter norming; 112118 students in spring norming  
  - **Geographical Location:** Nationwide  
  - **Socioeconomic Status:** Not reported  
  - **Ethnicity of Sample:** Not reported  
  - **Limited English Proficiency in Sample:** Not reported

### Where to Find Materials:
Here are 3 sources for free CBM-Oral Reading Fluency materials:
- **DIBELS NEXT:** Schools can obtain free ORF passages and ORF benchmarks for grades 1-6 from the DIBELS Next website: http://dibels.org/next.html
- **EasyCBM:** The easyCBM website (http://easycbm.com/) has collections of CBM-ORF passages (referred to as 'Passage Fluency') for grades 1-8. Teachers can create a free account on this website to access materials and benchmarks.
- **Schools can also make their own CBM Oral Reading Fluency passages in PDF format based on text typed in by the user using the Reading Fluency Passages Generator, a free online application:** http://www.interventioncentral.org/teacher-resources/oral-reading-fluency-passages-generator
How To: Assess Reading Comprehension With CBM: Maze Passages

A student's ability to comprehend text requires the presence of a bundle of component reading skills, including strong reading vocabulary, fluent decoding, and use of efficient and effective 'fix-up' strategies when encountering unknown words (National Institute of Child Health and Human Development, 2000). Motivation and attentiveness also play important roles in reading comprehension. While a student's understanding of text depends on many factors, however, teachers need a simple, time-efficient method both to screen students for reading-comprehension problems and to monitor the progress of any student who is receiving an academic intervention to improve text comprehension.

Curriculum-Based Measurement-Maze is a tool ideally suited to assess student reading comprehension (Parker, Hasbrouck, & Tindal, 1992). The student is given a specially formatted sample of text. The first sentence of the Maze passage is left intact. In the remainder of the passage, every seventh word is selected to be incorporated into a response item that consists of the original word plus two foils (words that would not make sense if substituted in the passage in place of the original, correct word). These three choices are randomly arranged and inserted back into the text. When reading the Maze passage, the reader reviews each response item and circles the word from the three choices that best restores the meaning of that segment of the passage.

Maze passages have been found to be better predictors of future reading performance than CBM oral reading fluency probes for students in grades 4 and higher (Hosp, Hosp & Howell, 2007).

CBM-Maze: How to Access Resources. Teachers can access a toolkit of resources for CBM-Maze, including: (1) materials for assessment, (2) guidelines for administration and scoring, and (3) research-based norms.

- **Materials for assessment.** Schools can access free Maze assessments with accompanying benchmarks for grades 2-6 at the DIBELS Next website: http://dibels.org/next.html Note: Users must create an account before they can download materials.
  
  Using the Maze Passage Generator, a free online application, teachers can generate their own CBM maze passages in PDF format from text typed in by the user:
  
  http://www.interventioncentral.org/tools/maze-passage-generator

- **Guidelines for administration and scoring.** Instructions for preparing, administering, and scoring CBM-Maze assessments appear later in this document:

- **Research-based norms.** A table, Curriculum-Based Measurement: Maze Passage Fluency Norms, is included in this document. The norms include fluency benchmarks for grades 2-6 (Jenkins & Jewell, 1993; Graney, Missall, Martinez, & Bergstrom, 2009) and accompanying weekly growth norms (Fuchs et al., 1993).

References


Curriculum-Based Measurement-Maze: Guidelines for Use

CBM-Maze: Description

CBM-Maze passages are timed (3-minute) reading comprehension assessments with a multiple-choice response format. The student reads and completes the passage silently. CBM-Maze can be administered to a single student, a small group, or an entire class (Espin et al., 2010).

CBM-Maze: Materials

The following materials are needed to administer CBM-Maze passages:

- Student and examiner copies of CBM Maze passage (the process for creating Maze passages is described below)
- Stopwatch
- Pencils for students

CBM-Maze: Preparation

Before administering CBM-Maze, the teacher creates or obtains a Maze passage, using these guidelines (Espin et al., 2010):

- Passages used for Maze should provide sufficient reading material to occupy students for 3 minutes of silent reading. Samples should be at least 300 words in length.
- The first sentence of the Maze passage is left intact.
- In the text following the first sentence, every seventh word is selected to be incorporated into a response item that consists of the original word plus two foils (words that would not make sense if substituted in the passage in place of the original, correct word). These three choices are randomly arranged and inserted back into the text. Here is a sample of a Maze response item: The rain (sang, cement, fell) on the garden.

Schools can obtain free Maze passages and Maze benchmarks for grades 2-6 from the DIBELS Next website: http://dibels.org/next.html

Schools can also obtain their own CBM Maze passages in PDF format based on text typed in by the user by accessing the Maze Passage Generator, a free online application: http://www.interventioncentral.org/teacher-resources/test-of-reading-comprehension

CBM-Maze: Directions for Administration (adapted from Sarasti, 2009)

1. The examiner distributes copies of CBM Maze probes to all the students in the group.
2. The examiner says: "When I say 'begin', start reading the story silently. Wherever you come to a group of 3 word-choices, circle the word that makes sense. Work as fast as you can but do your best work. If you finish the first page, go to the next page and continue working until I tell you to stop."
3. The examiner says: "Ready? Begin" and starts the stopwatch.
4. After 3 minutes, the examiner stops the stopwatch and says:"Stop. Pencils down".
5. These directions are repeated for each Maze passage administered in a session. The examiner then collects and scores the passages.
6. Initial Assessment: If the examiner is assessing the student for the first time, the examiner administers a total of 3 Maze probes during the session, using the above procedures and takes the median (middle) score as the best estimate of the student's reading-comprehension skills.
   Progress-Monitoring: If the examiner is monitoring student growth in computation (and has previously collected Maze data), only one Maze probe is given in the session.
CBM-Maze: Directions for Practice

If students are not yet familiar with the Maze, use the Maze practice page and accompanying examiner directions appearing later in this document to ensure student understanding of the activity before administering the assessment.

CBM-Maze: Scoring Guidelines

The examiner adds up the total number of correct responses, giving the student credit for each Maze choice-item in which the correct word is circled.

References


CBM-Maze: Directions for Practice (adapted from Sarasti, 2009)

If students are not yet familiar with the Maze, use the Maze practice page and these examiner directions to ensure student understanding of the assessment activity:

1. The examiner hands out copies of the Maze practice page to students.

2. The examiner says: "We will practice a story together. Look at the practice page. Read the first sentence to yourself while I read it aloud: The rain (sang, cement, fell) on the garden. The three choices are sang, cement, fell.

   The rain sang on the garden. That sentence does not make sense.  
   The rain cement on the garden. That sentence does not make sense.  
   So the correct word to circle is fell."

   [The examiner scans the group to ensure that all students circle the correct word before continuing.]

3. The examiner says: "Now go to the next sentence on the practice page. Read it to yourself while I read it aloud: The teacher walked (quickly, blue, trust) down the hall. Which word is the correct choice to complete the sentence?

   [Ensure that students chorally give the correct response before continuing.]

   That's right: The teacher walked quickly down the hall is correct, so circle the word quickly."

4. The examiner says: "Now read the next sentence on your practice page to yourself. Raise your hand when you have the answer.

   [When students are ready, the examiner reads the practice sentence with correct answer: The ship sailed (blank, toward, eight) the port.]

   Yes, the correct sentence is The ship sailed toward the port. Now that you have chosen the correct word, what do you do?"

   [The students should say "Circle it." The examiner ensures that all students fully understand the Maze response task.]

   Yes, you circle the correct word. You are ready to do the next story on your own."
CBM-Maze: Practice Page

1. The rain (sang, cement, fell) on the garden.

2. The teacher walked (quickly, blue, trust) down the hall.

3. The ship sailed (blank, toward, eight) the port.
Curriculum-Based Measurement: Maze Passage Fluency Norms
(Fuchs, Fuchs, Hamlett, Waltz, & Germann, 1993; Graney, Missall, Martinez, & Bergstrom, 2009; Jenkins & Jewell, 1993)*

**CBM-Maze** assesses basic student reading comprehension. In a Maze assessment, the student is given a passage in which every seventh word has been selected as a choice item. The student reads the passage silently. Each time the student comes to a choice item, the student chooses from among 3 replacement words: the correct word and two distractors. The student circles the replacement word that he or she believes best restores the meaning of the text. The Maze is timed: while the length of Maze assessments can vary, the most common time-standard is 3 minutes (Graney et al., 2009).

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall Maze</th>
<th>Fall: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Spring Maze</th>
<th>Spring: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Weekly Growth</th>
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<td>7 ↔ 23</td>
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<th>Winter: +/-1 SD (=16th%ile to 84th%ile)</th>
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<td>22</td>
<td>14 ↔ 30</td>
<td>26</td>
<td>18 ↔ 34</td>
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<table>
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<tr>
<th>Grade</th>
<th>Fall Maze</th>
<th>Fall: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Spring Maze</th>
<th>Spring: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Weekly Growth</th>
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<tbody>
<tr>
<td>6</td>
<td>33</td>
<td>22 ↔ 44</td>
<td>39</td>
<td>26 ↔ 52</td>
<td>0.40</td>
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</table>
References:


*Reported Characteristics of Student Sample(s) Used to Compile These Norms:

- **Fuchs et al., 1993**: Number of Students Assessed: 257 students across grades 2-6/Geographical Location: Upper Midwest: Sample drawn from 5 elementary schools/ Socioeconomic Status: 33%-55% rate of Free & Reduced Lunch across participating schools/ Ethnicity of Sample: Not reported/Limited English Proficiency in Sample: Not reported.
- **Graney, 2009**: Number of Students Assessed: Average of 444 students in each year of this 2-year study.; Grade 3: 151; Grade 4: 149; Grade 5: 144/Geographical Location: Midwest: Sample drawn from grades 3-5 in one rural school: 8 classrooms in grade 3; 7 classrooms in grade 4; 7 classrooms in grade 5/ Socioeconomic Status: 31% Free & Reduced Lunch/ Ethnicity of Sample: 93% White; 4% Multiracial; 2% African-American; 1% Latino/Limited English Proficiency in Sample: Not reported.
- **Jenkins & Jewell, 1993**: Number of Students Assessed: Grade 2: 47; Grade 6: 125/Geographical Location: Pacific Northwest: Sample drawn from grades 2 & 6 in two elementary schools/ Socioeconomic Status: 33% Free & Reduced Lunch/ Ethnicity of Sample: Not reported/Limited English Proficiency in Sample: Not reported.

Where to Find Materials: Schools can access free Maze assessments with accompanying benchmarks for grades 2-6 at the DIBELS Next website: http://dibels.org/next.html Note: Users must create an account before they can download materials.

Teachers can also create their own CBM Maze passages in PDF format based on text typed in by the user using the Maze Passage Generator, a free online application: http://www.interventioncentral.org/tools/maze-passage-generator

Limitations of These Research Norms: Norms generated from small-scale research studies—like those used here—provide estimates of student academic performance based on a sampling from only one or two points in time, rather than a more comprehensive sampling across separate fall, winter, and spring screenings. These norms also have been compiled from a relatively small student sample that is not fully representative of a diverse ‘national’ population. Nonetheless, norms such as these are often the best information that is publically available for basic academic skills and therefore do have a definite place in classroom instruction decision-making.

These norms can be useful in general education for setting student performance outcome goals for core instruction and/or any level of academic intervention. Similarly, these norms can be used to set performance goals for students with special needs. In both cases, however, single-sample norms would be used only if more comprehensive fall/winter/spring academic performance norms are not available.
How To: Assess Early Math Difficulties in the Primary Grades With CBM

In the early elementary grades, students’ success in mathematics can be predicted by assessing their acquisition and use of foundation numeracy skills (Gersten, Jordan, & Flojo, 2005). The term number sense is often used as short-hand to describe a child's emerging grasp of fundamental mathematical concepts such as what numbers mean, how sets of objects can be described in numerical terms, counting, and simple operations of mental arithmetic (Chard et al, 2005). Number sense is difficult to define with precision because the descriptor encompasses a wide range of early math skills (Clarke & Shinn, 2004). By the time a student has entered kindergarten or 1st grade, however, this term can be framed more concretely as a student's ability to access and use a mental number-line.

In the primary grades, the Common Core State Standards in Mathematics are built on the assumption that the successful math student can rapidly access a mental number line for use in such applied mathematical tasks as counting, making accurate comparisons between number, and estimating amounts. For example, a Kindergarten Counting & Cardinality standard (CCSM.K.CC.2) states that a student will "count forward beginning from a given number within the known sequence "(instead of having to begin at 1)." (National Governors Association Center for Best Practices et al., 2010; p. 11). Similarly, a Grade 1 standard for Number & Operations in Base 10 (CCSM.1.NBT.1) sets as a student goal to "count to 120, starting at any number less than 120. " (National Governors Association Center for Best Practices et al., 2010; p. 15). Clearly, these and other math standards for the early grades must depend on students’ ability to envision and mentally manipulate an internal number-line.

Early Math Fluency Measures: What They Are. Teachers at the primary level have a pressing need for screening tools that can quickly identify those students who require additional instructional support to address deficient number-sense skills. Early Math Fluency measures are one useful means to assess the strength of a young student's 'number sense' (Chard, et al., 2005) and serve as good predictors of mathematical readiness at Kindergarten and Grade 1. Early Math Fluency measures are examples of Curriculum-Based Measurement (Hosp, Hosp, & Howell, 2007) and include Quantity Discrimination, Missing Number, and Number Identification. All Early Math Fluency assessments have an administration time of 1 minute. Here are brief descriptions for three of these measures:

- **Quantity Discrimination:** The student is presented with pairs of numbers randomly sampled from 1-20 and must identify the larger number in each pair.

- **Missing Number:** The student is presented with response items consisting of 3 sequential numbers with one of those numbers randomly left blank. (Each 3-number series is randomly generated from the pool of numbers 1-20.) The student attempts to name the missing number in each series.

- **Number Identification:** The student is presented with a randomly generated series of numbers ranging from 1-20 and names as many of those numbers aloud as time allows.

Early Math Fluency Measures: How to Access Resources. Teachers who would like to screen their Kindergarten and Grade 1 students for possible number-sense delays can obtain these free Early Math Fluency assessment resources: (1) materials for assessment, (2) guidelines for administration and scoring, and (3) research-based norms.

- **Materials for assessment.** Schools can create their own CBM Early Math Fluency assessment materials at no cost, using NumberFly, a free online application:
http://www.interventioncentral.org/tools/early-math-fluency-generator

- Guidelines for administration and scoring. The following sets of instructions for preparing, administering, and scoring Early Math Fluency assessments appear later in this document:
  - Early Math Fluency/Quantity Discrimination: Guidelines for Use
  - Math Fluency/Missing Number: Guidelines for Use
  - Math Fluency/Number Identification: Guidelines for Use

- Research-based norms. A table, Curriculum-Based Measurement: Early Mathematics Fluency Norms, is included in this document. These fluency benchmarks were researched by Chard et al. (2005) and provide Fall/Winter/Spring screening norms for Quantity Discrimination, Missing Number, and Number Identification.

References


Early Math Fluency/Quantity Discrimination: Guidelines for Use

This introduction to the Quantity Discrimination probe provides information about the preparation, administration, and scoring of this Early Math CBM measure. Additionally, it offers brief guidelines for integrating this assessment into a school-wide ‘Response-to-Intervention’ model.

**Quantity Discrimination: Description** (Clarke & Shinn, 2004; Gersten, Jordan & Flojo, 2005)
The student is given a sheet containing pairs of numbers. In each number pair, one number is larger than the other. The numbers in each pair are selected from within a predefined range (e.g., no lower than 1 and no higher than 20). During a one-minute timed assessment, the student identifies the larger number in each pair, completing as many items as possible while the examiner records any Quantity Discrimination errors.

**Quantity Discrimination: Preparation**
The following materials are needed to administer Quantity Discrimination (QD) Early Math CBM probes:

- Student and examiner copies of a QD assessment probe. *(Note: Customized QD probes can be created conveniently and at no cost using Numberfly, a web-based application. Visit Numberfly at http://www.interventioncentral.org/php/numberfly/numberfly.php).*

- A pencil, pen, or marker

- A stopwatch

**Quantity Discrimination: Directions for Administration**
1. The examiner sits with the student in a quiet area without distractions. The examiner sits at a table across from the student.
2. The examiner says to the student:
   
   “The sheet on your desk has pairs of numbers. In each set, one number is bigger than the other.”

   “When I say, ‘start,’ tell me the name of the number that is larger in each pair. Start at the top of this page and work across the page [demonstrate by pointing]. Try to figure out the larger number for each example.. When you come to the end of a row, go to the next row. Are there any questions? [Pause] Start. “

   NOTE: If the student has difficulties with speech production, the examiner can use this alternate wording for directions: “When I say, ‘start,’ point to the number that is larger in each pair”

3. The examiner begins the stopwatch when the student responds aloud to the first item. If the student hesitates on a number for 3 seconds or longer on a Quantity Discrimination item, the examiner says, “Go to the next one.” (If necessary, the examiner points to the next number as a student prompt.)
4. The examiner marks each Quantity Discrimination error by marking a slash (/) through the incorrect response item on the examiner form.
5. At the end of one minute, the examiner says, “Stop” and writes in a right-bracket symbol ( ] ) on the examiner form after the last item that the student had attempted when the time expired. The examiner then collects the student Quantity Discrimination sheet.
6. **Initial Assessment:** If the examiner is assessing the student for the first time, the examiner administers a total of 3 QD probes during the session using the above procedures and takes the median (middle) score as the best estimate of the student’s QD skills.

**Progress-Monitoring:** If the examiner is monitoring student growth in QD (and has previously collected QD data), only one QD probe is given in the session.

### Quantity Discrimination: Directions for Practice

If the student is not yet familiar with QD probes, the teacher can administer one or more practice assessments (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

### Quantity Discrimination: Scoring Guidelines

**Correct QD responses include:**

- Quantity Discriminations read correctly
- Quantity Discriminations read incorrectly but corrected by the student within 3 seconds

**Incorrect QD responses include:**

- The student’s reading the smaller number in the QD number pair
- Correct QD responses given after hesitations of 3 seconds or longer
- The student’s calling out a number other than appears in the QD number pair
- Response items skipped by the student

To calculate a Quantity Discrimination fluency score, the examiner:

1. counts up all QD items that the student attempted to answer and
2. subtracts the number of QD errors from the total number attempted.
3. The resulting figure is the number of correct Quantity Discrimination items completed. (QD fluency score).

### Quantity Discrimination Probes as Part of a Response to Intervention Model

- **Universal Screening:** To proactively identify children who may have deficiencies in development of foundation math concepts, or ‘number sense’ (Berch, 2005), schools may choose to screen all kindergarten and first grade students using Quantity Discrimination probes. Those screenings would take place in fall, winter, and spring. Students who fall below the ‘cutpoint’ of the 35th percentile (e.g., Gersten, Jordan & Flojo, 2005) of the grade norms on the QD task would be identified as having moderate deficiencies and given additional interventions to build their ‘number sense’ skills.

- **Tier I (Classroom-Based) Interventions:** Teachers can create Quantity Discrimination probes and use them independently to track the progress of students who show modest delays in their math foundation skills.

- **Tier II (Individualized) Interventions.** Students with more extreme academic delays may be referred to a school-based problem-solving team, which will develop more intensive, specialized interventions to target the student’s academic deficits (Wright, 2007). Quantity Discrimination probes can be used as one formative measure to track student progress with Tier II interventions to build foundation math skills.
Quantity Discrimination: Measurement Statistics

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Predictive Validity Correlations for Quantity Discrimination Probes

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<th>Predictive Validity Measure</th>
<th>Correlation</th>
<th>Reference</th>
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<td>Curriculum-Based Measurement Math Computation Fluency Probes: Grade 1 Addition &amp; Subtraction (Fall Administration of QD Probe and Spring Administration of Math Computation Probe)</td>
<td>0.67</td>
<td>Clarke &amp; Shinn (2004)</td>
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<td>Number Knowledge Test</td>
<td>0.53</td>
<td>Chard, Clarke, Baker, Otterstedt, Braun &amp; Katz.(2005) cited in Gersten, Jordan &amp; Flojo (2005)</td>
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</tbody>
</table>

References


Early Math Fluency/Missing Number: Guidelines for Use

This introduction to the Missing Number probe provides information about the preparation, administration, and scoring of this Early Math CBM measure. Additionally, it offers brief guidelines for integrating this assessment into a school-wide ‘Response-to-Intervention’ model.

**Missing Number: Description** (Clarke & Shinn, 2004; Gersten, Jordan & Flojo, 2005)
The student is given a sheet containing multiple number series. Each series consists of 3-4 numbers that appear in sequential order. The numbers in each short series are selected to fall within a predefined range (e.g., no lower than 1 and no higher than 20). In each series, one number is left blank (e.g., ‘1 2 _ 4’). During a one-minute timed assessment, the student states aloud the missing number in as many response items as possible while the examiner records any Missing Number errors.

**Missing Number: Preparation**
The following materials are needed to administer Missing Number (MN) Early Math CBM probes:

- Student and examiner copies of a MN assessment probe. (Note: Customized MN probes can be created conveniently and at no cost using Numberfly, a web-based application. Visit Numberfly at [http://www.interventioncentral.org/php/numberfly/numberfly.php](http://www.interventioncentral.org/php/numberfly/numberfly.php)).
- A pencil, pen, or marker
- A stopwatch

**Missing Number: Directions for Administration**

1. The examiner sits with the student in a quiet area without distractions. The examiner sits at a table across from the student.

2. The examiner says to the student:

   "The sheet on your desk has sets of numbers. In each set, a number is missing."

   "When I say, 'start,' tell me the name of the number that is missing from each set of numbers. Start at the top of this page and work across the page [demonstrate by pointing]. Try to figure out the missing number for each example. When you come to the end of a row, go to the next row. Are there any questions? [Pause] Start."

   NOTE: If the student has difficulties with speech production, the examiner can give the student a pencil and use this alternate wording for directions: "When I say, 'start, write in the number that is missing from each set of numbers.'"

3. The examiner begins the stopwatch when the student reads the first number aloud. If the student hesitates on a number for 3 seconds or longer on a Missing Number item, the examiner says the correct number aloud and says, “Go to the next one.” (If necessary, the examiner points to the next number as a student prompt.)

4. The examiner marks each Missing Number error by marking a slash (/) through the incorrect response item on the examiner form.
5. At the end of one minute, the examiner says, “Stop” and writes in a right-bracket symbol ( ] ) on the examiner form after the last item that the student had attempted when the time expired. The examiner then collects the student Missing Number sheet.

6. **Initial Assessment:** If the examiner is assessing the student for the first time, the examiner administers a total of 3 MN probes during the session using the above procedures and takes the median (middle) score as the best estimate of the student's MN skills.

   **Progress-Monitoring:** If the examiner is monitoring student growth in MN (and has previously collected MN data), only one MN probe is given in the session.

**Missing Number: Directions for Practice**

If the student is not yet familiar with MN assessments, the teacher can administer one or more practice MN probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

**Missing Number: Scoring Guidelines**

Correct MN responses include:

- Missing numbers read correctly
- Missing numbers read incorrectly but corrected by the student within 3 seconds

Incorrect MN responses include:

- Missing numbers read incorrectly
- Missing numbers read correctly after hesitations of 3 seconds or longer
- Response items skipped by the student

To calculate a Missing Number fluency score, the examiner:

1. counts up all MN items that the student attempted to read aloud and
2. subtracts the number of MN errors from the total number attempted.
3. The resulting figure is the number of correct Missing Number items completed. (MN fluency score).

**Missing Number Probes as Part of a Response to Intervention Model**

- **Universal Screening:** To proactively identify children who may have deficiencies in development of foundation math concepts, or ‘number sense’ (Berch, 2005), schools may choose to screen all kindergarten and first grade students using Missing Number probes. Those screenings would take place in fall, winter, and spring. Students who fall below the ‘cutpoint’ of the 35th percentile (e.g., Gersten, Jordan & Flojo, 2005) of the grade norms on the MN task would be identified as having moderate deficiencies and given additional interventions to build their ‘number sense’ skills.

- **Tier I (Classroom-Based) Interventions:** Teachers can create Missing Number probes and use them independently to track the progress of students who show modest delays in their math foundation skills.

- **Tier II (Individualized) Interventions:** Students with more extreme academic delays may be referred to a school-based problem-solving team, which will develop more intensive, specialized interventions to target the student’s academic deficits (Wright, 2007). Missing Number probes can be used as one formative measure to track student progress with Tier II interventions to build foundation math skills.

**Missing Number: Measurement Statistics**
### Test-Retest Reliability Correlations for Missing Number Probes

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### Predictive Validity Correlations for Missing Number Probes

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<th>Predictive Validity Measure</th>
<th>Correlation</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Curriculum-Based Measurement Math Computation Fluency Probes: Grade 1 Addition &amp; Subtraction (Fall Administration of MN Probe and Spring Administration of Math Computation Probe)</td>
<td>0.67</td>
<td>Clarke &amp; Shinn (2004)</td>
</tr>
<tr>
<td>Woodcock-Johnson Tests of Achievement: Applied Problems subtest (Fall Administration of MNF Probe and Spring Administration of WJ-ACH subtest)</td>
<td>0.72</td>
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<td>Number Knowledge Test</td>
<td>0.61</td>
<td>Chard, Clarke, Baker, Otterstedt, Braun &amp; Katz.(2005) cited in Gersten, Jordan &amp; Flojo (2005)</td>
</tr>
</tbody>
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### References


Early Math Fluency/Number Identification: Guidelines for Use

This introduction to the Number Identification probe provides information about the preparation, administration, and scoring of this Early Math CBM measure. Additionally, it offers brief guidelines for integrating this assessment into a school-wide ‘Response-to-Intervention’ model.

**Number Identification: Description** (Clarke & Shinn, 2004; Gersten, Jordan & Flojo, 2005)
The student is given a sheet containing rows of randomly generated numbers (e.g., ranging from 1 to 20). During a one-minute timed assessment, the student reads aloud as many numbers as possible while the examiner records any Number Identification errors.

**Number Identification: Preparation**
The following materials are needed to administer Number Identification (NID) Early Math CBM probes:

- Student and examiner copies of a NID assessment probe. *(Note: Customized NID probes can be created conveniently and at no cost using Numberfly, a web-based application. Visit Numberfly at http://www.interventioncentral.org/php/numberfly/numberfly.php).*

- A pencil, pen, or marker

- A stopwatch

**Number Identification: Directions for Administration**

1. The examiner sits with the student in a quiet area without distractions. The examiner sits at a table across from the student.

2. The examiner says to the student:

   "The sheet on your desk has rows of numbers."

   "When I say, 'start,' begin reading the numbers aloud. Start at the top of this page and read across the page [demonstrate by pointing]. Try to read each number. When you come to the end of a row, go to the next row. Are there any questions? [Pause] Start."

3. The examiner begins the stopwatch when the student reads the first number aloud. If the student hesitates on a number for 3 seconds or longer, the examiner says, “Go to the next one.” (If necessary, the examiner points to the next number as a student prompt.)

4. The examiner marks each Number Identification error by marking a slash (/) through the incorrectly read number on the examiner form.

5. At the end of one minute, the examiner says, “Stop” and writes in a right-bracket symbol ( ] ) on the examiner form from the point in the number series that the student had reached when the time expired. The examiner then collects the student Number Identification sheet.

6. **Initial Assessment:** If the examiner is assessing the student for the first time, the examiner administers a total of 3 NID probes during the session using the above procedures and takes the median (middle) score as the best estimate of the student's NID skills.

   **Progress-Monitoring:** If the examiner is monitoring student growth in NID (and has previously collected NID data), only one NID probe is given in the session.
Number Identification: Directions for Practice

If the student is not yet familiar with NID assessments, the teacher can administer one or more practice NID probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

Number Identification: Scoring Guidelines
Correct NID responses include:
- Numbers read correctly
- Numbers read incorrectly but corrected by the student within 3 seconds

Incorrect NID responses include:
- Numbers read incorrectly
- Numbers read correctly after hesitations of 3 seconds or longer
- Numbers skipped by the student

To calculate a Number Identification fluency score, the examiner:

1. counts up all numbers that the student attempted to read aloud and
2. subtracts the number of errors from the total of numbers attempted.
3. The resulting figure is the number of correct numbers identified (NID fluency score).

Number Identification Probes as Part of a Response to Intervention Model

- Universal Screening: To proactively identify children who may have deficiencies in development of foundation math concepts, or 'number sense' (Berch, 2005), schools may choose to screen all kindergarten and first grade students using Number Identification probes. Those screenings would take place in fall, winter, and spring. Students who fall below the 'cutpoint' of the 35th percentile (e.g., Jordan & Hanich, 2003) of the grade norms on the NID task would be identified as having moderate deficiencies and given additional interventions to build their 'number sense' skills.

- Tier I (Classroom-Based) Interventions: Teachers can create Number Identification probes and use them independently to track the progress of students who show modest delays in their math foundation skills.

- Tier II (Individualized) Interventions: Students with more extreme academic delays may be referred to a school-based problem-solving team, which will develop more intensive, specialized interventions to target the student’s academic deficits (Wright, 2007). Number Identification probes can be used as one formative measure to track student progress with Tier II interventions to build foundation math skills.

Number Identification: Measurement Statistics

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<td>Clarke &amp; Shinn (2004)</td>
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<td>26-week interval</td>
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### Predictive Validity Correlations for Number Identification Probes

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<td>0.72</td>
<td>Clarke &amp; Shinn (2004)</td>
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### References


### Curriculum-Based Measurement: Early Mathematics Fluency

**Norms** (Chard, Clarke, Baker, Otterstedt, Braun, & Katz, 2005)*

**CBM-Early Mathematics Fluency** measures assess the strength of a student’s ‘number sense’ (Chard, et al., 2005) and are good predictors of mathematical readiness at Kindergarten and Grade 1. Early Math Fluency measures include Quantity Discrimination, Missing Number, and Number Identification. All Early Math Fluency assessments have an administration time of 1 minute.

#### Quantity Discrimination (QD): 1 Minute: The student is presented with pairs of numbers randomly sampled from 1-20 and must identify the larger number in each pair.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall QD (Chard et al., 2005)</th>
<th>Fall: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Winter QD (Chard et al., 2005)</th>
<th>Winter: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Spring QD (Chard et al., 2005)</th>
<th>Spring: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Weekly Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>15</td>
<td>8↔22</td>
<td>20</td>
<td>8↔32</td>
<td>23</td>
<td>12↔34</td>
<td>0.25</td>
</tr>
<tr>
<td>1</td>
<td>23</td>
<td>16↔30</td>
<td>30</td>
<td>21↔39</td>
<td>37</td>
<td>28↔46</td>
<td>0.44</td>
</tr>
</tbody>
</table>

#### Missing Number (MN): 1 Minute: The student is presented with response items consisting of 3 sequential numbers with one of those numbers randomly left blank. (Each 3-number series is randomly generated from the pool of numbers 1-20.) The student attempts to name the missing number in each series.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall MN (Chard et al., 2005)</th>
<th>Fall: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Winter MN (Chard et al., 2005)</th>
<th>Winter: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Spring MN (Chard et al., 2005)</th>
<th>Spring: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Weekly Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>3</td>
<td>0↔7</td>
<td>10</td>
<td>3↔17</td>
<td>14</td>
<td>7↔21</td>
<td>0.34</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>3↔15</td>
<td>17</td>
<td>11↔23</td>
<td>20</td>
<td>14↔26</td>
<td>0.34</td>
</tr>
</tbody>
</table>

#### Number Identification (NID): 1 Minute: The student is presented with a randomly generated series of numbers ranging from 1-20 and names as many of those numbers aloud as time allows.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall NID (Chard et al., 2005)</th>
<th>Fall: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Winter NID (Chard et al., 2005)</th>
<th>Winter: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Spring NID (Chard et al., 2005)</th>
<th>Spring: +/-1 SD (≈16th%ile to 84th%ile)</th>
<th>Weekly Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>14</td>
<td>0↔28</td>
<td>45</td>
<td>27↔63</td>
<td>56</td>
<td>38↔74</td>
<td>1.31</td>
</tr>
<tr>
<td>1</td>
<td>34</td>
<td>18↔50</td>
<td>53</td>
<td>36↔70</td>
<td>62</td>
<td>46↔78</td>
<td>0.88</td>
</tr>
</tbody>
</table>


*Reported Characteristics of Student Sample(s) Used to Compile These Norms: Number of Students Assessed: Kindergarten: 168; Grade 1: 207/Geographical Location: Pacific Northwest; Sample drawn from 7 elementary schools in one district of 5500 students/Socioeconomic Status: Students qualifying for free and reduced lunch: Range of 27% to 69% across 7 participating schools/Ethnicity: District population: 13% minorities/ELLs: District Population: 4% English Language Learners

Where to Find Materials: Schools can create their own CBM Early Math Fluency assessment materials at no cost, using NumberFly, a free online application: [http://www.interventioncentral.org/tools/early-math-fluency-generator](http://www.interventioncentral.org/tools/early-math-fluency-generator) This program generates printable student and examiner assessment sheets for CBM Quantity Discrimination, Missing...
Number, and Number Identification. From this site, the user can also download guidelines for administering and scoring these Early Math Fluency measures.
How To: Assess Mastery of Math Facts With CBM: Computation Fluency

Computation Fluency measures a student's accuracy and speed in completing 'math facts' using the basic number operations of addition, subtraction, multiplication, and division. Computation fluency in the elementary grades is a strong predictor of later success in higher-level math coursework (Gersten, Jordan, & Flojo, 2005).

For students to attain 'computational fluency', however, they must be both accurate and speedy in solving basic math facts--ideally through automatic recall (VanDerHeyden & Burns, 2008). In an influential report, the National Mathematics Advisory Panel (2008) stressed the need for students to become proficient in math facts, calling on schools to make it a priority to "develop automatic recall of addition and related subtraction facts, and of multiplication and related division facts." (p. xix).

The Common Core Standards also recognize the importance of computation fluency. For example, a 4th-grade math standard in Number and Operations in Base Ten (CCSM.4.NBT.4) states that the student will "fluently add and subtract multi-digit whole numbers using the standard algorithm" (National Governors Association Center for Best Practices et al., 2010; p. 29). However, the challenge for teachers is to define specifically what level of performance is required to identify a student as fluent in computation.

CBM-Computation Fluency is a brief, timed assessment that can indicate to teachers whether a student is developing computation fluency and is thus on track to master grade-appropriate math facts (basic computation problems). This assessment can be administered to an individual student or to larger groups. The student is given a worksheet containing math facts and is given 2 minutes to answer as many problems as possible. The worksheet is then collected and scored, with the student receiving credit for each correct digit in his or her answers. Teachers can then compare any student's performance to research norms to determine whether that student is at risk because of delayed computational skills (Burns, VanDerHeyden, & Jiban, 2006).

**Computation Fluency Measures: How to Access Resources.** Teachers who would like to screen their students in grades 1 through 6 for possible delays in computation skills can obtain these free Computation Fluency assessment resources: (1) materials for assessment, (2) guidelines for administration and scoring, and (3) research-based norms.

- **Materials for assessment.** Schools can customize their own CBM Computation Fluency assessment materials at no cost, using the Math Worksheet Generator, a free online application: [http://www.interventioncentral.org/teacher-resources/math-work-sheet-generator](http://www.interventioncentral.org/teacher-resources/math-work-sheet-generator)

  This program generates printable student and examiner assessment sheets for CBM Computation Fluency.

- **Guidelines for administration and scoring.** Instructions for preparing, administering, and scoring CBM-Computation Fluency assessments appear later in this document:

- **Research-based norms.** A table, *Curriculum-Based Measurement: Computation Fluency Norms* is included in this document. The table contains fluency benchmarks for grades 1-6, drawn from several research studies (e.g., Burns, VanDerHeyden, & Jiban, 2006).

**References**


Curriculum-Based Measurement-Computation Fluency: Guidelines for Use

CBM-Computation Fluency: Description

CBM-Computation Fluency measures a student's accuracy and speed in completing 'math facts' using the basic number operations of addition, subtraction, multiplication, and division. CBM-Computation Fluency probes are 2-minute assessments of basic math facts that are scored for number of 'correct digits'.

There are 2 types of CBM math probes, single-skill worksheets (those containing like problems) and multiple-skill worksheets (those containing a mix of problems requiring different math operations). Single-skill probes give instructors good information about students' mastery of particular problem-types, while multiple-skill probes allow the teacher to test children's math competencies on a range of computational objectives during a single CBM session.

Both types of math probes can be administered either individually or to groups of students. The examiner hands the worksheet(s) out to those students selected for assessment. Next, the examiner reads aloud the directions for the worksheet. Then the signal is given to start, and students proceed to complete as many items as possible within 2 minutes. The examiner collects the worksheets at the end of the assessment for scoring.

CBM-Computation Fluency: Materials

The following materials are needed to administer CBM-Computation Fluency:

- Student and examiner copies of CBM Computation Fluency Probes
- Stopwatch
- Pencils for students

CBM-Computation Fluency: Preparation

After computational objectives have been selected, the instructor is ready to prepare math probes. The teacher may want to create single-skills probes, multiple-skill probes, or both types of CBM math worksheets. The teacher will probably want to consult the Common Core State Standards for Mathematics or district math curriculum when selecting the kinds of problems to include in the single- or multiple-skill probe.

Creating the single-skill math probe. As the first step in putting together a single-skill math probe, the teacher will select one computational objective as a guide. The worksheet, then, will consist of problems randomly constructed that conform to the computational objective chosen.
For example, the instructor may select any of the computational objectives in Figure 1 as the basis for a math probe. The teacher would then construct a series of problems that match the computational goal, as in Figure 2. In general, single-skill math probes should contain between 80 and 200 problems, and worksheets should have items on both the front and back of the page. Adequate space should also be left for the student to show his or her work, especially with more complex problems such as long division.

Creating the Multiple-skill Math Probe. To assemble a multiple-skill math probe, the instructor will first select the range of math operations and of problem-types that will make up the probe. Once the computational objectives have been chosen, the teacher can make up a worksheet of mixed math facts conforming to those objectives. Using our earlier example, the teacher who wishes to estimate the proficiency of his 4th-grade math group may decide to create a multiple-skills CBM probe. He could choose to sample only those problem-types that his students have either mastered or are presently being taught. Figure 3 shows four computation skills with matching sample problems that might appear on a worksheet of mixed math facts.

NOTE: Schools can customize their own CBM Computation Fluency assessment materials at no cost, using the Math Worksheet Generator, a free online application:
http://www.interventioncentral.org/teacher-resources/math-work-sheet-generator

CBM-Computation Fluency: Directions for Administration

1. The examiner distributes copies of math probes to all the students in the group, face down. (Note: These probes may also be administered individually). The examiner says to the students: "The sheets on your desk are math facts."
2. If the students are to complete a single-skill probe, the examiner says: "All the problems are [addition or subtraction or multiplication or division] facts."
If the students are to complete a multiple-skill probe, the examiner then says: "There are several types of problems on the sheet. Some are addition, some are subtraction, some are multiplication, and some are division [as appropriate]. Look at each problem carefully before you answer it."

3. The examiner then says: "When I say 'begin', turn the worksheet over and begin answering the problems. Start on the first problem on the left on the top row [point]. Work across and then go to the next row. If you can't answer a problem, make an 'X' on it and go to the next one. If you finish one side, go to the back. Are there any questions? ".

4. The examiner says 'Start' and starts the stopwatch. While the students are completing worksheets, the examiner and any other adults assisting in the assessment circulate around the room to ensure that students are working on the correct sheet and that they are completing problems in the correct order (rather than picking out only the easy items).

5. After 2 minutes have passed, the examiner says, "Stop" and collects the CBM computation probes for scoring.

6. **Initial Assessment:** If the examiner is assessing the student for the first time, the examiner administers a total of 3 computation probes during the session using the above procedures and takes the median (middle) score as the best estimate of the student's computation fluency.

   **Progress-Monitoring:** If the examiner is monitoring student growth in computation (and has previously collected CBM-Computation Fluency data), only one computation probe is given in the session.

**CBM-Computation Fluency: Directions for Practice**

If the student is not yet familiar with CBM-Computation Fluency probes, the teacher can administer one or more practice computation probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

**CBM-Computation Fluency: Scoring Guidelines**

Traditional approaches to computational assessment usually give credit for the total number of correct answers appearing on a worksheet. If the answer to a problem is found to contain one or more incorrect digits, that problem is marked wrong and receives no credit. In contrast to this all-or-nothing marking system, CBM assigns credit to each individual correct digit appearing in the solution to a math fact.

On the face of it, a math scoring system that awards points according to the number of correct digits may appear unusual, but this alternative approach is grounded in good academic-assessment research and practice. By separately scoring each digit in the answer of a computation problem, the instructor is better able to recognize and to give credit for a student's partial math competencies. Scoring computation problems by the digit rather than as a single answer also allows for a more minute analysis of a child's number skills.

Imagine, for instance, that a student was given a CBM math probe consisting of addition problems, sums less than or equal to 19 (incorrect digits appear in boldface and italics):

![Figure 4: Example of completed problems from a single-skill math probe](image)

<table>
<thead>
<tr>
<th>105</th>
<th>2031</th>
<th>111</th>
<th>634</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 600</td>
<td>+ 531</td>
<td>+ 717</td>
<td>+ 8240</td>
</tr>
<tr>
<td>+ 293</td>
<td>+ 2322</td>
<td>+ 260</td>
<td>+ 203</td>
</tr>
<tr>
<td>988</td>
<td>4884</td>
<td>1087</td>
<td>9077</td>
</tr>
</tbody>
</table>
If the answers in Figure 4 were scored as either correct or wrong, the child would receive a score of 1 correct answer out of 4 possible answers (25 percent). However, when each individual digit is scored, it becomes clear that the student actually correctly computed 12 of 15 possible digits (80 percent). Thus, the CBM procedure of assigning credit to each correct digit demonstrates itself to be quite sensitive to a student's emerging, partial competencies in math computation.

The following scoring rules will aid the instructor in marking single- and multiple-skill math probes:

- Individual correct digits are counted as correct.
  Reversed or rotated digits are not counted as errors unless their change in position makes them appear to be another digit (e.g., 9 and 6).

- Incorrect digits are counted as errors.
  Digits that appear in the wrong place value, even if otherwise correct, are scored as errors.
  Example

```
97
x 9
8730
```
  "873" is the correct answer to this problem, but no credit can be given since the addition of the 0 pushes the other digits out of their proper place-value positions.

- The student is given credit for "place-holder" numerals that are included simply to correctly align the problem. As long as the student includes the correct space, credit is given whether or not a "0" has actually been inserted.
  Example

```
55
x 82
110
4400
4510
```
  Since the student correctly placed 0 in the "place-holder" position, it is given credit as a correct digit.
  Credit would also have been given if the space were reserved but no 0 had been inserted.

- In more complex problems such as advanced multiplication, the student is given credit for all correct numbers that appear below the line.

```
33
x 28
264
660
924
```
  Credit is given for all work below the line. In this example, the student earns credit for 9 correct digits.

- Credit is not given for any numbers appearing above the line (e.g., numbers marked at the top of number columns to signify regrouping).

```
1
46
+ 39
85
```
  Credit is given for the 2 digits below the line. However, the carried "1" above the line does not receive credit.
Curriculum-Based Measurement: Computation Fluency Norms

(Burns, VanDerHeyden, & Jiban, 2006; Deno & Mirkin, 1977; Fuchs & Fuchs, 1993; Fuchs & Fuchs, n.d.)*

CBM-Computation Fluency measures a student's accuracy and speed in completing 'math facts' using the basic number operations of addition, subtraction, multiplication, and division. Computation fluency in the elementary grades is a strong predictor of later success in higher-level math coursework (Gersten, Jordan, & Flojo, 2005). CBM-Computation Fluency probes are 2-minute assessments of basic math facts that are scored for number of 'correct digits'.

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>0.3</td>
<td>0.5</td>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>Mastery</td>
<td>More than 31</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frustration</td>
<td>Less than 14</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mastery</td>
<td>More than 31</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frustration</td>
<td>Less than 14</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mastery</td>
<td>More than 49</td>
<td>0.75</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24-49</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frustration</td>
<td>Less than 24</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mastery</td>
<td>More than 49</td>
<td>0.75</td>
<td>1.2</td>
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<tr>
<td></td>
<td></td>
<td>24-49</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frustration</td>
<td>Less than 24</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mastery</td>
<td>More than 79</td>
<td>0.45</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40-79</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frustration</td>
<td>Less than 40</td>
<td></td>
</tr>
</tbody>
</table>
References:

*Reported Characteristics of Student Sample(s) Used to Compile These Norms:*
- **Burns, VanDerHeyden, & Jiban, 2006:** Number of Students Assessed: 434 students across grades 2-5/Geographical Location: Southwest; Sample drawn from 1 elementary school/ Socioeconomic Status: 15% rate of Free & Reduced Lunch/ Ethnicity of Sample: 74% Caucasian-non-Hispanic; 17% Hispanic or Latino; 6% African-American; 3% Asian-American; 1% Native American/Limited English Proficiency in Sample: 2% of students.
- **Deno & Mirkin, 1977:** Number of Students Assessed: Not reported/Geographical Location: Sample drawn from 1 elementary school; location not reported/ Socioeconomic Status: Not reported/ Ethnicity of Sample: Not reported/Limited English Proficiency in Sample: Not reported.
- **Fuchs & Fuchs, n.d.:** Number of Students Assessed: Not reported/Geographical Location: Not reported/ Socioeconomic Status: Not reported/ Ethnicity of Sample: Not reported/Limited English Proficiency in Sample: Not reported.
- **Fuchs & Fuchs, 1993:** Number of Students Assessed: Year 1: 177 students in grades 1-6; Year 2:1208 students across grades 1-6/Geographical Location: Upper Midwest; Sample drawn from 5 elementary schools/ Socioeconomic Status: 33%-55% rate of Free & Reduced Lunch across participating schools/ Ethnicity of Sample: Not reported/Limited English Proficiency in Sample: Not reported.

Where to Find Materials: Schools can create their own CBM Computation Fluency assessment materials at no cost, using the Math Worksheet Generator, a free online application:
http://www.interventioncentral.org/teacher-resources/math-work-sheet-generator

This program generates printable student and examiner assessment sheets for CBM Computation Fluency.

Limitations of These Research Norms: Norms generated from small-scale research studies--like those used here--provide estimates of student academic performance based on a sampling from only one or two points in time, rather than a more comprehensive sampling across separate fall, winter, and spring screenings. These norms also have been compiled from a relatively small student sample that is not fully representative of a diverse 'national' population. Nonetheless, norms such as these are often the best information that is publically available for basic academic skills and therefore do have a definite place in classroom instruction decision-making.

These norms can be useful in general education for setting student performance outcome goals for core instruction and/or any level of academic intervention. Similarly, these norms can be used to set performance goals for students with special needs. In both cases, however, single-sample norms would be used only if more comprehensive fall/winter/spring academic performance norms are not available.
How To: Track Growth in Written Expression in the Elementary Grades With CBM

The act of writing is complex. Translating thought into written expression requires that the student master a host of foundation writing skills, including the physical production of text; and mastery of rules of capitalization, spelling, punctuation, and syntax (Robinson & Howell, 2008).

Tracking student growth in emerging writing skills can be confusing and time-consuming for teachers. However, Curriculum-Based Measurement-Written Expression (CBM-WE) is an efficient, reliable method of formative student assessment that yields numeric indicators that are instructionally useful—such as total words written, correctly spelled words, and correct writing sequences (Gansle et al., 2006). CBM-WE probes are group-administered writing samples with an administration time of about 4 minutes. CBM-Written Expression is therefore a powerful means to monitor a student's progress in the mechanics and conventions of writing.

CBM-Written Expression: What It Measures. Teachers have several assessment options to choose from when using CBM-Written Expression (Gansle et al., 2006; Wright, 1992):

- **Total Words Written (TWW):** This measure is a count of the total words written during the CBM-WE assessment. Teachers might select Total Words Written as a progress-monitoring target if the student needs to focus on writing fluency (getting more words onto the page).

- **Correctly Spelled Words (CSW):** This measure is a count of correctly spelled words written during the CBM-WE assessment. If poor spelling is a blocker to student writing, the teacher may select this monitoring target.

- **Correct Writing Sequences (CWS):** This measure is a tabulation of correct 'writing sequences' written during the CBM-WE assessment. One Correct Writing Sequence is scored whenever two adjacent units of writing (e.g., two words appearing next to each other) are found to be correct in their punctuation, capitalization, spelling, and syntactical and semantic usage. When the student is expected to have mastered the basic mechanics and conventions of writing, Correct Writing Sequences are a useful method to track this group of interrelated skills.

CBM-Written Expression Fluency Measures: How to Access Resources. Teachers who wish to screen their students in basic writing skills can obtain these free CBM-Written Expression assessment resources: (1) materials for assessment, (2) guidelines for administration and scoring, and (3) research-based norms.

- **Materials for assessment.** Schools can create their own CBM Written Expression Fluency assessment materials at no cost, using the Written Expression Probe Generator, a free online application: [http://www.interventioncentral.org/tools/writing-probe-generator](http://www.interventioncentral.org/tools/writing-probe-generator)

  This program allows the user to customize and to generate printable story-starter worksheets in PDF format.

- **Guidelines for administration and scoring.** Instructions for preparing, administering, and scoring CBM-Written Expression assessments appear later in this document:

- **Research-based norms.** A table, *Curriculum-Based Measurement: Written Expression Fluency Norms*, is included in this document. The norms include fluency benchmarks for grades 1-6 (Malecki & Jewell, 2003) and growth norms for grades 1-4 (Tadatada, 2011).

References


Curriculum-Based Measurement-Written Expression: Guidelines for Use

CB-Written Expression: Description (McMaster & Espin, 2007)
CBM-Written Expression probes are simple to administer and offer several scoring options. Written-expression probes may be given individually or to groups of students. The examiner prepares a lined composition sheet with a story-starter sentence or partial sentence at the top. The student thinks for 1 minute about a possible story to be written from the story-starter, then spends 3 minutes writing the story. The examiner collects the writing sample for scoring. Depending on the preferences of the teacher, the writing probe can be scored in several ways, as explained below (from Wright, 1992).

CBM-Written Expression: Materials
The following materials are needed to administer CBM-Written Expression probes:

- Student copy of CBM writing probe with story-starter (the process for creating story-starters is described below)
- Stopwatch
- Pencils for students

CBM-Written Expression: Preparation
Before administering CBM-Written Expression, the teacher selects a ‘story starter’ (a brief introductory sentence or partial sentence) to serve as a prompt to elicit student story writing. The teacher selects a story-starter and places it at the top of a lined composition sheet. The story-starter should avoid wording that encourages students to generate lists. It should also be open-ended, requiring the writer to build a narrative rather than simply to write down a "Yes" or "No" response.

Schools can create their own CBM Written Expression Fluency assessment materials at no cost, using the Written Expression Probe Generator, a free online application: http://www.interventioncentral.org/tools/writing-probe-generator
This program allows the user to customize and to generate printable story-starter worksheets in PDF format.

The CBM writing probe in Figure 1 is an example of how a such a probe might be formatted. (This particular probe was used in a 5th-grade classroom.):

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**Figure 1: Example of a CBM writing probe**

<table>
<thead>
<tr>
<th>CBM Writing Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: ______________ Grade: _____ Date: ______________</td>
</tr>
<tr>
<td>One day, I was out sailing. A storm carried me far out to sea and wrecked my boat on a desert island. __________________________________________________</td>
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Jim Wright, Presenter  www.interventioncentral.org
CBM-Written Expression: Directions for Administration

1. The examiner distributes copies of CBM writing probes to all the students in the group. (Note: These probes may also be administered individually).
2. The examiner says to the students: *I want you to write a story. I am going to read a sentence to you first, and then I want you to write a short story about what happens. You will have 1 minute to think about the story you will write and then have 3 minutes to write it. Do your best work. If you don't know how to spell a word, you should guess. Are there any questions? For the next minute, think about . . . [insert story-starter].*
3. The examiner starts the stopwatch. At the end of 1 minute, the examiner says, *Start writing.*
4. While the students are writing, the examiner and any other adults helping in the assessment circulate around the room. If students stop writing before the 3-minute timing period has ended, monitors encourage them to continue writing.
5. After 3 additional minutes, the examiner says, *Stop writing.* CBM writing probes are collected for scoring.
6. *Initial Assessment:* If the examiner is assessing the student for the first time, the examiner administers a total of 3 CBM:WE probes during the session, using the above procedures and takes the median (middle) score as the best estimate of the student’s CBM:WE skills.
   *Progress-Monitoring:* If the examiner is monitoring student growth in computation (and has previously collected CBM:WE data), only one CBM:WE probe is given in the session.

CBM-Written Expression: Directions for Practice

If the student is not yet familiar with CBM:WE assessments, the teacher can administer one or more practice CBM:WE probes (using the administration guidelines above) and provide coaching and feedback as needed until assured that the student fully understands the assessment.

CBM-Written Expression: Scoring Guidelines

The instructor has several options when scoring CBM writing probes. Student writing samples may be scored according to the:

1. Total Words Written (TWW),
2. Correctly Spelled Words (CSW), or
3. Correct Writing Sequences (One Correct Writing Sequence is scored whenever two adjacent units of writing (e.g., two words appearing next to each other) are found to be correct in their punctuation, capitalization, spelling, and syntactical and semantic usage.)

Scoring methods differ both in the amount of time that they require of the instructor and in the type of information that they provide about a student's writing skills. Advantages and potential limitations of each scoring system are presented below.

Total Words Written (TWW). The examiner counts up and records the total number of words written during the 3-minute writing probe. Misspelled words are included in the tally, although numbers written in numeral form (e.g., 5, 17) are not counted. Calculating total words is the quickest of scoring methods. A drawback, however, is that it yields only a rough estimate of writing fluency (that is, of how quickly the student can put words on paper) without examining the accuracy of spelling, punctuation, and other writing conventions. A 6th-grade student wrote the CBM writing sample in Figure 2. Using the total-words scoring formula, this sample is found to contain 45 words, including misspellings.
Correctly Spelled Words. The examiner counts up only those words in the writing sample that are spelled correctly. Words are considered separately, not within the context of a sentence. When scoring a good rule of thumb is to determine whether—in isolation—the word represents a correctly spelled term in English. If it does, the word is included in the tally. Assessing the number of correctly spelled words has the advantage of being quick. Also, by examining the accuracy of the student's spelling, this approach monitors to some degree a student's mastery of written language. As seen in figure 3, our writing sample contains 39 correctly spelled words.

Correct Writing Sequences. When scoring correct writing sequences, the examiner goes beyond the confines of the isolated word to consider units of writing and their relation to one another. Using this approach, the examiner starts at the beginning of the writing sample and looks at each successive pair of writing units (writing sequence). Words are
considered separate writing units, as are essential marks of punctuation. To receive credit, writing sequences must be correctly spelled and be grammatically correct. The words in each writing sequence must also make sense within the context of the sentence. In effect, the student's writing is judged according to the standards of informal standard American English. A caret (^) is used to mark the presence of a correct writing sequence.

Figure 4: An illustration of selected scoring rules for correct writing sequences

Since the first word begins the sentence correctly, it is marked as a correct writing sequence.

Because the period is considered essential punctuation, it is joined with the words before and after it to make two correct writing sequences.

Misspelled words cannot be counted as correct writing sequences.

Grammatical or syntactical errors cannot be counted as correct writing sequences.
The following scoring rules will aid the instructor in determining correct writing sequences:

- Correctly spelled words make up a correct writing sequence (reversed letters are acceptable, so long as they do not lead to a misspelling):
  
  Example
  
  ^Is^that^a^red^car^?

- Necessary marks of punctuation (excluding commas) are included in correct writing sequences:
  
  Example
  
  ^Is^that^a^red^car^?

- Syntactically correct words make up a correct writing sequence:
  
  Example
  
  ^Is^that^a^red^car^?
  
  ^Is^that^a^car^ red?

- Semantically correct words make up a correct writing sequence:
  
  Example
  
  ^Is^that^a^red^car^?
  
  ^Is^that^a^ read^ car^?

- If correct, the initial word of a writing sample is counted as a correct writing sequence:
  
  Example
  
  ^Is^that^a^red^car^?

- Titles are included in the correct writing sequence count:
  
  Example
  
  ^The^Terrible^Day

Not surprisingly, evaluating a writing probe according to correct writing sequences is the most time-consuming of the scoring methods presented here. It is also the scoring approach, however, that yields the most comprehensive information about a student's writing competencies. While further research is needed to clarify the point, it also seems plausible that the correct writing sequence method is most sensitive to short-term student improvements in writing. Presumably, advances in writing skills in virtually any area (e.g., spelling, punctuation) could quickly register as higher writing sequence scores. Our writing sample in Figure 5 is found to contain 37 correct writing sequences.
**Figure 5: CBM Writing sample scored for Correct Writing Sequence (Each correct writing sequence is marked with a caret(^)).**

```
^I woud drink^water^from^the^ocean^  5 correct writing sequences
^and^I woud eat^the^fruit^off^of
^the^trees^.^Then^I woud bilit a
^house^out^of^trees, ^and^I woud
gather^firewood^to^stay^warm^.^I
woud try^and^fix^my^boat^in^my
^spare^time^.  
```

References


Curriculum-Based Measurement: Written-Expression Fluency Norms (Gansle, VanDerHeyden, Noell, Resetar, & Williams, 2006; Malecki & Jewell, 2003; Tadatada, 2011)*

**CBM-Written Expression** assessments measure the mechanics and conventions of writing and can yield numeric indicators such as total words written, correctly spelled words, and correct writing sequences (Gansle et al., 2006). CBM-Written Expression probes are group-administered writing samples with an administration time of about 4 minutes.

### Total Words Written (TWW): This measure is a count of the total words written during the CBM-WE assessment.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall TWW (Malecki &amp; Jewell, 2003)</th>
<th>Fall: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Spring TWW (Malecki &amp; Jewell, 2003)</th>
<th>Spring: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Weekly Growth (Tadatada, 2011)</th>
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<td>14</td>
<td>7↔21</td>
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<td>24</td>
<td>14↔34</td>
<td>31</td>
<td>19↔43</td>
<td>0.43</td>
</tr>
<tr>
<td>3</td>
<td>36</td>
<td>23↔49</td>
<td>36</td>
<td>24↔48</td>
<td>0.35</td>
</tr>
<tr>
<td>4</td>
<td>41</td>
<td>30↔52</td>
<td>46</td>
<td>30↔62</td>
<td>0.25</td>
</tr>
<tr>
<td>5</td>
<td>51</td>
<td>34↔68</td>
<td>67</td>
<td>43↔91</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>44</td>
<td>31↔57</td>
<td>58</td>
<td>44↔72</td>
<td>--</td>
</tr>
</tbody>
</table>

### Correctly Spelled Words (CSW): This measure is a count of correctly spelled words written during the CBM-WE assessment.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall CSW (Malecki &amp; Jewell, 2003)</th>
<th>Fall: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Spring CSW (Malecki &amp; Jewell, 2003)</th>
<th>Spring: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Weekly Growth (Tadatada, 2011)</th>
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<td>1↔9</td>
<td>10</td>
<td>3↔17</td>
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<tr>
<td>5</td>
<td>48</td>
<td>31↔65</td>
<td>65</td>
<td>42↔88</td>
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<tr>
<td>6</td>
<td>42</td>
<td>29↔55</td>
<td>56</td>
<td>41↔71</td>
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</tbody>
</table>

### Correct Writing Sequences (CWS): This measure is a tabulation of correct 'writing sequences' written during the CBM-WE assessment. One Correct Writing Sequence is scored whenever two adjacent units of writing (e.g., two words appearing next to each other) are found to be correct in their punctuation, capitalization, spelling, and syntactical and semantic usage.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fall CWS (Malecki &amp; Jewell, 2003)</th>
<th>Fall: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Spring CWS (Malecki &amp; Jewell, 2003)</th>
<th>Spring: +/-1 SD (=16th%ile to 84th%ile)</th>
<th>Weekly Growth (Tadatada, 2011)</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0↔4</td>
<td>7</td>
<td>1↔13</td>
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<td>2</td>
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<tr>
<td>3</td>
<td>28</td>
<td>14↔42</td>
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<td>38</td>
<td>25↔51</td>
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<td>0.22</td>
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<tr>
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<td>46</td>
<td>28↔64</td>
<td>63</td>
<td>40↔86</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>41</td>
<td>27↔55</td>
<td>54</td>
<td>37↔71</td>
<td>--</td>
</tr>
</tbody>
</table>
References:

*Reported Characteristics of Student Sample(s) Used to Compile These Norms:*

**Malecki & Jewell, 2003:** Number of Students Assessed: 946 Total; Grade 1: Fall:133 -Spring:123; Grade 2: Fall:200 -Spring:156; Grade 3: Fall:168 -Spring:109; Grade 4: Fall:192 -Spring:182; Grade 5: Fall:127 -Spring:120; Grade 6: Fall:57 -Spring:54/Geographical Location: Northern Illinois; Sample drawn from 5 suburban and rural schools across three districts/ Socioeconomic Status: Not reported/Ethnicity of Sample: Not reported/English Language Learners in Sample: Not reported.

**Tadatada, 2011:** Number of Students Assessed: 1,004 Total; Grade 1: 207; Grade 2: 208; Grade 3: 204; Grade 4: 220; Grade 5: 165/Geographical Location: Bowling Green, KY; Sample drawn from 5 elementary schools in single district/ Socioeconomic Status: Not reported/Ethnicity of Sample: 64% White; 18% African-American; 13% Hispanic; 3% Asian; 3% Other/Limited English Proficiency in Sample: 19%.

Where to Find Materials: Schools can create their own CBM Written Expression Fluency assessment materials at no cost, using the Written Expression Probe Generator, a free online application:


This program allows the user to customize and to generate printable story-starter worksheets in PDF format.

Limitations of These Research Norms: Norms generated from small-scale research studies—like those used here—provide estimates of student academic performance based on a sampling from only one or two points in time, rather than a more comprehensive sampling across separate fall, winter, and spring screenings. These norms also have been compiled from a relatively small student sample that is not fully representative of a diverse ‘national’ population. Nonetheless, norms such as these are often the best information that is publically available for basic academic skills and therefore do have a definite place in classroom instruction decision-making.

These norms can be useful in general education for setting student performance outcome goals for core instruction and/or any level of academic intervention. Similarly, these norms can be used to set performance goals for students with special needs. In both cases, however, single-sample norms would be used only if more comprehensive fall/winter/spring academic performance norms are not available.