INTERVENTION CENTRAL

RTI Toolkit: A Practical Guide for Schools

Using Data to Understand and Fix Student Academic and Behavior Problems

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Frequently Asked Questions About… Assessment & Progress-Monitoring

Tier 1: Universal Screening of All Students

1. What are schoolwide academic screenings? Schools may choose to administer schoolwide screening measures as a proactive means to locate students at risk for academic or behavioral failure. For academic screenings, the school selects a standard set of measures to use in the screening that are quick to administer and provide predictive information about student academic success. Academic screenings are conducted at least three times per year—typically in fall, winter, and spring. The school shares that screening data with classroom teachers to help them to adjust their instructional practices. Additionally, the school uses academic screening data to determine which students are performing below academic expectations and require supplemental intervention.

   Universal academic screening data has several important uses. It can help the school to estimate efficiently the typical academic skill level of any grade, as well as to proactively identify those struggling students who need supplemental intervention support. Additionally, schools can use universal screening information to better allocate instructional and intervention resources to the appropriate grade levels or pockets of struggling students

2. What academic screening tools can be used in middle and high schools to proactively identify students at risk? There is broad agreement that universal screenings should be a central part of RTI implementation. However, one size does not fill all: The types of academic screeners that a given middle and high school adopts should be matched to the typical levels of student performance at that school. Schools whose students often perform below expectations on basic skills such as reading fluency or comprehension may find curriculum-based measures such as CBM Oral Reading Fluency to be helpful to flag students at risk. In contrast, buildings whose students have typically mastered basic academic skills might adopt assessments that track higher-level problem-solving abilities and advanced curriculum goals. A listing of academic screening tools with good measurement characteristics can be found on the National Center for RTI website at http://www.rti4success.org.

3. Can existing data be used as a source of screening information for at-risk students? Yes. Schools can use archival information about student grades, attendance records, and office disciplinary referrals as one source of screening information. At key points during the school year (e.g., every five weeks), the school could review this existing information to identify students who appear to be having problems with their academic performance, school attendance, or classroom behavior. Identified students might then be provided with appropriate interventions.

Tier 1: Collecting Background and Diagnostic Information

4. What kind of background information can a teacher collect to better understand why a student is experiencing an academic or behavioral problem? When a student is having academic or behavioral difficulties in the classroom, the teacher can use a systematic approach to collecting information that will increase the chance of finding a solution to the student's problem. First, the teacher should pose and answer questions that are most likely to result in better student outcomes. The

acronym ICEL can remind the teacher to ask what role if any each of the following factors may play in the student's presenting problems: Instruction ("What instructional techniques used in the current classroom appear to help or hinder the student?"); Curriculum ("What are the student's current academic skills as they map to the school's curriculum expectations?"); Environment ("What non-instructional factors in the student's academic environment--such as interactions with peers—exist that may impact learning?"); Learner ("What traits might the student possess such as chronic inattention or lack of self-confidence in math skills that could impact learning?").

Second, the teacher should take care to collect information across a range of sources to reduce the possibility that any one source will bias the findings. The acronym RIOT can help the teacher to remember to sample the several possible sources of student information: Review of records; Interview of other teachers, parents, or the student; Observation of the student engaged in academic tasks; and more structured in-class Testing of the student if needed.

5. How can the classroom teacher survey a student's academic skills when needed to diagnose specific skill deficits? For students who present with large apparent skill gaps, schoolwide screening data alone will probably not give enough information to fully understand the reason(s) for their academic problems. For selected students with significant academic delays, then, teachers or schools may wish to conduct an in-depth instructional assessment (sometime also referred to as an *analytic* or *diagnostic* assessment) to identify specific areas of academic deficit or delay. Schools can purchase commercial academic products to conduct diagnostic assessments. While it may be convenient to have a ready-made assessment package to survey student skills, however, such products can be expensive and do not necessarily assess all of the relevant skills in a particular school's curriculum.

   Another option is for teachers to create their own customized instructional assessments, to include items that match the real-life academic demands of the classroom. When creating instructional assessments, the teacher first decides what academic skills to assess by reviewing the district curriculum to identify academic skills from the student's current and earlier grades that are essential for success in the course. Once the teacher has selected the important curriculum or course academic skills to be assessed, the next step is to convert those skills to actual assessment items. For each academic skill being tested, the teacher should construct several test items— to provide enough information to allow the teacher to make accurate judgments about whether the student has mastered a given skill. Just how many test items should be created to assess a skill will depend on how specific the skill definition is. If an academic skill is narrowly defined, 3 to 5 teacher-constructed items should be sufficient to assess that skill. However, if a skill is defined in broad terms, more than five items may be required to fully assess it.

Tier 1: Monitoring Student Progress

6. Once an intervention has begun, what is the interventionist's responsibility in monitoring students' progress? When a student receiving an RTI intervention at the Tier 1, 2, or 3 level, the educator implementing that intervention (the interventionist) is expected to monitor the student's progress regularly to judge whether the intervention is effective. It is recommended that the classroom teacher monitor Tier 1 interventions at least once per week. Tier 2 interventions should be monitored 1-2 times per month. Intensive Tier 3 interventions should be monitored at least weekly. The interventionist should measure the student's baseline level in the academic or behavioral target skill before the intervention begins and should also calculate a performance goal that the student will attain by the end of the intervention period if that intervention is successful

7. How role does a clear problem identification statement play in student progress-monitoring? The success of any RTI intervention hinges on a problem-identification statement that describes in crystal-clear terms the student academic or behavioral problem that is to be the focus of the intervention. A clear problem-identification statement can greatly simplify the task of selecting a method of progress-monitoring. For example, a teacher is initially unable to think of a way to measure the Tier 1 progress of a student whose behavioral problem is vaguely defined as "Frank is off-task in class". However, the teacher then restates the student problem as "On 20-minute in-class writing assignments, Frank talks with peers about non-instructional topics and requires an average each session of 3 redirections back to task by the teacher." This teacher discovers in the process of redefining the student problem that she can use the method of tallying the number of times that she has to redirect the student to task to calculate the baseline level of the student problem (an average of 3 teacher redirections required), to set a student goal for improvement, and even to monitor the student's progress.

8. Why is it important to determine baseline performance and to set a goal before monitoring the progress of a student on intervention? Baseline and goal are the two 'bookend' measurements that are essential to allow the classroom teacher or other interventionist to make sense of progress-monitoring data. Before starting the intervention, the interventionist first needs to collect baseline information to calculate the student's starting point on the academic skill or behavior that is the intervention target. With baseline in hand, the interventionist can next set a goal for improvement that the student is expected to reach by the end of the intervention period if that intervention is actually effective. When the intervention concludes, the interventionist can compare the student's actual performance to the goal to determine if the intervention was indeed a success. If an interventionist monitors student progress on intervention but has not both calculated baseline and set an outcome goal, the monitoring data lacks a meaningful context and will be of little use.

9. How can the student be involved in collecting and interpreting progress-monitoring data? Giving the student responsibilities in monitoring their progress on intervention can both motivate and teach the student to take greater responsibility for his or her own learning and behavior. One idea is to have students collect their own progress-monitoring data. For example, a student on an intervention to increase homework completion might maintain a homework log, noting each assignment and the date it was turned in. A second idea is to have students set or review the intervention goal and then regularly monitor their progress toward the goal. For example, a teacher who assigns homework every day may meet with a student and set the goal that the student turn in completed homework on time on at least 80 percent of the days (4 days out of five)—a considerable improvement from the student's current 40 percent completion rate. Then every Friday during the intervention period, teacher and student meet briefly to review the student's actual homework completion rate for the week.

RTI Decision Rules

10. How does a school set data decision rules to judge whether a student is an RTI 'non-responder'? Districts that have adopted an RTI model must develop their own decision rules for determining whether a general-education student who has received interventions across the Tiers is an RTI 'non-responder'. Those decision rules should include answers to the following questions:

- What is the minimum length of time that interventions at Tiers 1, 2, & 3 should last? (Recommendation: Interventions at Tier 1 should last at least 4-8 instructional weeks, while those at Tiers 2 and 3 should last at least 6-8 instructional weeks.)

- What is the minimum number of intervention trials that should be attempted? (Recommendation: Across Tiers 2 and 3, a total of at least 3 separate intervention trials should be attempted before deciding that a student is a non-responder to intervention.)

Of course, data collected during each intervention trial should be of high quality, with baseline, goal, and regular progress-monitoring.

The RIOT/ICEL Matrix: Organizing Data to Answer Questions About Student Academic Performance & Behavior

When a student displays serious academic or behavioral deficits, the Response to Intervention model adopts an inductive approach that begins with educators collecting a range of information to better analyze and understand the student's intervention needs (Fuchs, Fuchs & Compton, 2010).

However, this investigative RTI problem-solving approach can be compromised at the outset in several ways (Hosp, 2008). For example, educators may draw from too few sources when pulling together information about the presenting problem(s)—e.g., relying primarily on interviews with one classroom teacher -- which can bias the findings. Also, educators may not consider the full range of possible explanations for the student's academic or behavioral problems—such as instructional factors or skill-deficits—and thus fail to collect information that would confirm or rule out those competing hypotheses. And finally, educators may simply not realize when they have reached the 'saturation point' in data collection (Hosp, 2008) when stockpiling still more data will not significantly improve the understanding of the student problem.

One tool that can assist schools in their quest to sample information from a broad range of sources and to investigate all likely explanations for student academic or behavioral problems is the RIOT/ICEL matrix. This matrix helps schools to work efficiently and quickly to decide what relevant information to collect on student academic performance and behavior—and also how to organize that information to identify probable reasons why the student is not experiencing academic or behavioral success.

The RIOT/ICEL matrix is not itself a data collection instrument. Instead, it is an organizing framework, or heuristic, that increases schools' confidence both in the quality of the data that they collect and the findings that emerge from the data (Hosp, 2006, May). The top horizontal row of the RIOT/ICEL table includes four potential sources of student information: Review, Interview, Observation, and Test (RIOT). Schools should attempt to collect information from a range of sources to control for potential bias from any one source.

The leftmost vertical column of the RIO/ICEL table includes four key domains of learning to be assessed: Instruction, Curriculum, Environment, and Learner (ICEL). A common mistake that schools often make is to assume that student learning problems exist primarily in the learner and to underestimate the degree to which teacher instructional strategies, curriculum demands, and environmental influences impact the learner's academic performance. The ICEL elements ensure that a full range of relevant explanations for student problems are examined.

Select Multiple Sources of Information: RIOT. The elements that make up the top horizontal row of the RIOT/ICEL table (Review, Interview, Observation, and Test) are defined as follows:

- Review. This category consists of past or present records collected on the student. Obvious examples include report cards, office disciplinary referral data, state test results, and attendance records. Less obvious examples include student work samples, physical products of teacher interventions (e.g., a sticker chart used to reward positive student behaviors), and

emails sent by a teacher to a parent detailing concerns about a student's study and organizational skills.

- Interview. Interviews can be conducted face-to-face, via telephone, or even through email correspondence. Interviews can also be structured (that is, using a pre-determined series of questions) or follow an open-ended format, with questions guided by information supplied by the respondent. Interview targets can include those teachers, paraprofessionals, administrators, and support staff in the school setting who have worked with or had interactions with the student in the present or past. Prospective interview candidates can also consist of parents and other relatives of the student as well as the student himself or herself.

- Observation. Direct observation of the student's academic skills, study and organizational strategies, degree of attentional focus, and general conduct can be a useful channel of information. Observations can be more structured (e.g., tallying the frequency of call-outs or calculating the percentage of on-task intervals during a class period) or less structured (e.g., observing a student and writing a running narrative of the observed events). Obvious examples of observation include a teacher keeping a frequency count of the times that she redirects an inattentive student to task during a class period and a school psychologist observing the number of intervals that a student talks with peers during independent seatwork Less obvious examples of observation include having a student periodically rate her own academic engagement on a 3-point scale (self-evaluation) and encouraging a parent to send to school narrative observations of her son's typical routine for completing homework.

- Test. Testing can be thought of as a structured and standardized observation of the student that is intended to test certain hypotheses about why the student might be struggling and what school supports would logically benefit the student (Christ, 2008). Obvious examples of testing include a curriculum-based measurement Oral Reading Fluency probe administered to determine a student's accuracy and fluency when reading grade-level texts and a state English Language Arts test that evaluates students' mastery of state literacy standards. A less obvious example of testing might be a teacher who teases out information about the student's skills and motivation on an academic task by having that student complete two equivalent timed worksheets under identical conditions—except that the student is offered an incentive for improved performance on the second worksheet but not on the first ('Can't Do/Won't Do Assessment'). Another less obvious example of testing might be a student who has developed the capacity to take chapter pre-tests in her math book, to self-grade the test, and to write down questions and areas of confusion revealed by that test for later review with the math instructor.

Investigate Multiple Factors Affecting Student Learning: ICEL. The elements that compose the leftmost vertical column of the RIO/ICEL table (Instruction, Curriculum, Environment, and Learner) are described below:

- Instruction. The purpose of investigating the 'instruction' domain is to uncover any instructional practices that either help the student to learn more effectively or interfere with that student's learning. More obvious instructional questions to investigate would be whether specific teaching strategies for activating prior knowledge better prepare the student to master

new information or whether a student benefits optimally from the large-group lecture format that is often used in a classroom. A less obvious example of an instructional question would be whether a particular student learns better through teacher-delivered or self-directed, computer-administered instruction.

- Curriculum. 'Curriculum' represents the full set of academic skills that a student is expected to have mastered in a specific academic area at a given point in time. To adequately evaluate a student's acquisition of academic skills, of course, the educator must (1) know the school's curriculum (and related state academic performance standards), (2) be able to inventory the specific academic skills that the student currently possesses, and then (3) identify gaps between curriculum expectations and actual student skills. (This process of uncovering student academic skill gaps is sometimes referred to as 'instructional' or 'analytic' assessment.) More obvious examples of curriculum questions include checking whether a student knows how to computer a multiplication problem with double-digit terms and regrouping or whether that student knows key facts about the Civil War. A less obvious curriculum-related question might be whether a student possesses the full range of essential academic vocabulary (e.g., terms such as 'hypothesis') required for success in the grade 10 curriculum.

- Environment. The 'environment' includes any factors in students' school, community, or home surroundings that can directly enable their academic success or hinder that success. Obvious questions about environmental factors that impact learning include whether a student's educational performance is better or worse in the presence of certain peers and whether having additional adult supervision during a study hall results in higher student work productivity. Less obvious questions about the learning environment include whether a student has a setting at home that is conducive to completing homework or whether chaotic hallway conditions are delaying that student's transitioning between classes and therefore reducing available learning time.

- Learner. While the student is at the center of any questions of instruction, curriculum, and [learning] environment, the 'learner' domain includes those qualities of the student that represent their unique capacities and traits. More obvious examples of questions that relate to the learner include investigating whether a student has stable and high rates of inattention across different classrooms or evaluating the efficiency of a student's study habits and test-taking skills. A less obvious example of a question that relates to the learner is whether a student harbors a low sense of self-efficacy in mathematics that is interfering with that learner's willingness to put appropriate effort into math courses.

Integrating the RIOT/ICEL Matrix into a Building's Problem-Solving. The power of the RIOT/ICEL matrix lies in its use as a cognitive strategy, one that helps educators to verify that they have asked the right questions and sampled from a sufficiently broad range of data sources to increase the probability that they will correctly understand the student's presenting concern(s). Viewed in this way, the matrix is not a rigid approach but rather serves as a flexible heuristic for exploratory problem-solving.

At the very least, RTI consultants should find that the RIOT/ICEL matrix serves as a helpful mental framework to guide their problem-solving efforts. And as teachers over time become more familiar

with the RTI model, they also might be trained to use the RIOT/ICEL framework as they analyze student problems in their classrooms and prepare Tier 1 interventions.

References

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RIOT/ICEL Matrix Example: The matrix below is filled out with some possible sources of information on a student, Rick, whose mathematics teacher is concerned at his apparent *lack of academic engagement in large-group settings*. NOTE: The examples in the matrix are for purposes of illustration only. It is probably somewhat unlikely that all of these sources of information would be collected for a single student, unless his or her needs were intensive.

	Review	Interview	Observe	Test
Instruction	• [Review-Instruction] Review of past report cards: The teacher searches for comments from former instructors about instructional techniques to which Rick did or did not respond.	• [Interview-Instruction] Teacher interview: The instructor is asked by the guidance counselor which instructional elements help Rick to attend in large-group instruction and which are less effective.	• [Observe-Instruction] Classroom observation: During large-group instruction, an observer calculates Rick's rate of on-task behavior (e.g., through momentary time-sampling).	• [Test-Instruction] Note-taking conditions: The teacher structures two large-group instruction conditions--regular note-taking and guided notes – and observes whether Rick's level of academic engagement improves with guided notes.
Curriculum	• [Review-Curriculum] Work products: The teacher collects the student's math homework and examines it for evidence about whether Rick is able correctly to use the algorithms taught in class.	• [Interview-Curriculum] Student interview: The guidance counselor meets with Rick to ask him a series of questions about his math skills.	• [Observe-Curriculum] Classroom observation: The teacher pairs students, directs each to describe to the other his/her reasoning for solving a multi-step word problem with math graphic. Rick is observed during this exercise.	• [Test-Curriculum] Diagnostic test: The teacher prepares and administers to the class a diagnostic test with problems that test essential foundation math knowledge required for success in the course. Rick's test results are carefully reviewed.
Environment	• [Review-Environment] Folder review: Rick's cumulative folder is reviewed for past instructor comments about aspects of the instructional environment (e.g., presence or absence of peers, teacher proximity) that helped or hindered academic performance.	• [Interview-Environment] Parent interview: At a parent conference, the teacher asks Rick's father to describe the student's nightly homework routine, as well as those factors in the homework setting that appear to help or hinder Rick's homework completion.	• [Observe-Environment] Classroom observation: During observations of Rick in a large-group math setting, the observer looks for environmental factors—e.g., presence or absence of peers, teacher proximity) that help or hinder academic performance.	• [Test-Environment] Peer seating conditions: On different occasions, the instructor (a) allows Rick to choose his own seat-mates and (b) seats Rick next to positive peer role models. The instructor observes whether Rick's level of academic engagement improves in the peer role-model condition.
Learner	• [Review-Learner] Math journal: The math teacher collects Rick's math journal and reviews the entries for hints about the student's attitude and level of self-confidence toward mathematics [Learner characteristic: math self-efficacy].	• [Interview-Learner] Parent interview: In an email exchange with the student's mother, the teacher asks her about her son's study habits [Learner characteristic: study & organizational skills]	• [Observe-Learner] Behavior rating based on observation: For one week, the math teacher rates the student daily on a behavior report card. One of the several rating items is the student's 'time on task' [Learner characteristic: attentional focus].	• [Test-Learner] Reward conditions: On different occasions, the teacher (a) has Rick participate in large-group instruction with no reward and (b) offers Rick an incentive (reward) if he requires no more than 1 teacher prompt per session to direct him back to task. The instructor observes whether Rick's engagement increases in the reward condition [Learner characteristic: attentional focus].

RIOT/ICEL Assessment Worksheet

Student: _____ Person Completing Worksheet: _____

Date: _____ Statement of Student Problem: _____

_____

Directions: Fill out the grid below to develop an assessment plan for the targeted student.

	Review	Interview	Observe	Test
Instruction				
Curriculum				
Environment				
Learner				

Estimating 'Typical Peer Academic Performance': A Review of Methods

Use the guide below to evaluate various methods for estimating typical peer academic performance to be used when formulating a student's intervention goal.

Type of Peer Comparison: Description	Strengths/Weaknesses	Sample Rationale
Research Norms Based on Fall/Winter/Spring Screenings. The ideal source for performance information in any academic area is a set of high-quality research norms that: • are predictive of student success in the targeted academic area(s) • are drawn from a large, representative student sample • include fall, winter, and spring norms • provide an estimate of student risk for academic failure (e.g., that are divided into percentile tables or include score cut-offs denominating low risk/some risk/at risk). Examples of publicly available academic research norms can be found on these websites: EasyCBM.com: http://www.easycbm.com DIBELS NEXT: http://dibels.org/next.html	Appropriate Use(s) for This Performance Data Source: Research norms based on fall/winter/spring screening data can be used for the full range of instructional decision-making, including setting student performance outcome goals for core instruction and/or any level of RTI intervention in general education and for setting performance goals on IEPs. These norms can also be useful at Special Education Eligibility Team meetings to verify whether a student has moved into a lower level of academic risk as a result of RTI interventions. Limitations of This Performance Data Source: There are no significant limitations in using these research norms.	*"We chose to use these norms because they provide the highest-quality information available about student academic performance. They are accurate predictors of student success, have been created using a representative student sample, are broken out into fall/winter/spring norms, and do a good job of estimating the level of academic risk faced by any individual student."*
Research Norms Based on a Single Academic Performance Sample. Norms generated from research studies or other sources may provide estimates of student academic performance based on a sampling from a single point in time, rather than a more comprehensive sampling	Appropriate Use(s) for This Performance Data Source: Norms drawn from a single 'snapshot' student sample can be useful in general education for setting student performance outcome goals for core instruction and/or any level of RTI intervention. Similarly, these norms can be used to set student performance goals on	*"We used these single-sample norms to set student performance goals because they are drawn from research and were*

across separate fall, winter, and spring screenings. These norms may also have been compiled from a relatively small student sample that is not demographically representative of a diverse 'national' population. Nonetheless, these norms are often the best information that is publically available for skills such as mathematics computation—and therefore do have a definite place in RTI decision-making.	IEPs. In both cases, however, single-sample norms would be used only if more comprehensive fall/winter/spring screening norms are not available. Limitations of This Performance Data Source: Single-sample academic norms can be used for RTI decision-making if there is no better normative information available. However, Special Education Eligibility Teams should be cautious in interpreting these norms, as they do not reflect typical student growth across fall, winter, and spring screenings; and are likely to be based on a small student sample that may not be demographically representative of the school's or district's students.	*the best information available to us. Because the norms were collected at one point in time, however, and were drawn from a small student sample, we realize that these norms should be interpreted cautiously—especially when used for decisions about special education eligibility."*
Local Norms: Multiple Classrooms. Local norms across classrooms are generated when a district or school administers an academic screener in multiple classrooms at a grade level and compiles the data into norms that display the range of student abilities in that local setting. For example, a district may administer a brief curriculum-based measure in writing to the entire third grade in its three elementary schools to produce local norms by district and building for correctly spelled words per minute. Local norms can be very helpful in identifying which students in a particular school stand out from peers because of academic skill deficits and to estimate the appropriate amount of intervention resources necessary to help those discrepant students to close that local academic gap. However, unlike research norms, local norms do not provide an absolute standard of student academic competence.	Appropriate Use(s) for This Performance Data Source: Schools can use data from local norms across classrooms to identify which students are struggling relative to their classmates, to quantify the academic gap that separates these struggling students from the majority of their local peers, and therefore to match them to appropriate intervention resources to close that gap. Local academic norms can also be useful for special educators, since these norms provide a means for estimating the minimum skill levels that a student with an IEP will need (e.g., in oral reading fluency) to survive instructionally when mainstreamed in a particular general-education setting. Limitations of This Performance Data Source: Because local norms across classrooms are tied to the relative skill level of a particular student population, they cannot provide an external, objective standard for minimum competency in the academic skill. In other words, local norms vary, depending on the demographic and other characteristics of the school or district being normed. So	*"Our school used these local norms from multiple classrooms because they helped us to identify which students fell farthest from the local academic average and thus are likely to need additional intervention support to be successful in their classrooms. We also understand that local norms give us information limited to the student's performance in this school. Only research norms can provide an objective, research-based*

	a Special Education Eligibility Team could use local norms to verify that student indeed is struggling in academic skills relative to his or her peers. However, those same local norms would not give the Team an absolute, research-derived cut-off for academic competence independent of the district's average student skill level necessary to certify that the student is an RTI 'non-responder'.	*view of the student's skills compared to a national average."*
Local Norms: Single Classroom. Teachers can develop informal academic-performance norms by screening all students in their classroom. Students are administered a standardized screening measure (e.g., timed Maze reading comprehension screening lasting for 3 minutes). The teacher next scores the screener and rank-orders the student results. The teacher can then set a cutpoint (e.g., the lowest 20 percent of scores on the Maze task) to select students to receive additional (Tier 1) core-instruction and/or intervention support.	Appropriate Use(s) for This Performance Data Source: Local norms compiled from a single general-education classroom can be very efficient in identifying general-education students who would benefit from extra teacher support in core instruction or may even need specific teacher-delivered interventions. Because local classroom norms estimate the range of current skill levels in a room, they can also be valuable in aiding educators to better plan to support students with special needs included in those settings. Limitations of This Performance Data Source: Local classroom norms may not be representative of average skill levels in other classrooms—even in the same school-- so interpretation of such norms should be limited to the classrooms from which they were derived. Also, self-contained special education settings might find that local norms compiled in their classrooms are not particularly useful. This is because students in such a program are likely to have a range of special education classifications and a correspondingly wide range of academic skills. With such widely discrepant academic skills among students, classroom norms may not yield a meaningful group-level estimate of 'average' performance.	*"We screened students in our single classroom using measures of basic academic skills. These local norms have helped us to be proactive in finding students in the room who need additional core instruction or intervention support. However, we realize that norms from one classroom can be meaningfully applied only to that classroom. To come up with a shared standard of average local student performance across a whole grade level, our school will need to screen multiple classrooms and combine the results."*
Local Norms: Small Group. The most informal (and low-cost) means for developing local norms is for the teacher to select a	Appropriate Use(s) for This Performance Data Source: Local norms derived through sampling a small group provide an informal	*"We compiled local norms with a small group of*

small number (e.g., 3-5) of students who—in the teacher's estimation--possess average abilities on the academic skill to be normed. The teacher administers this small group a standardized screening measure (e.g., timed Maze reading comprehension screening lasting for 3 minutes). The teacher rank-orders the group's screening results and selects the median student score to provide a rough estimate of a 'typical' level of peer academic performance.	but useful estimate of typical classroom academic performance. The teacher at Tier 1 can use these small-group norms to determine how severe a struggling student's academic delays are. That is, the teacher can administer the same screening measure used to compile the small-group norms to a particular student experiencing academic delays. The teacher then compares the target student's screening result to the informal small-group peer norm to quantify that struggling student's current skill gap. Small-group academic norms may also be a useful tool for special educators, since these general-education norms could provide a low-cost means for estimating the skill levels that a student with an IEP will need (e.g., in oral reading fluency) to be mainstreamed in a particular general-education setting. Limitations of This Performance Data Source: Small-group local norms provide at best only a rough estimate of classroom academic skill levels. They should be used for Tier 1 (classroom) core-instruction and intervention planning only when information of higher quality (e.g., research norms, grade-wide local norms, class-wide local norms) are not available. These informal norms would also not be appropriate for higher-stakes, more intensive interventions at Tiers 2 and 3.	*students in our classroom because there were no better norms available and we did not have the resources or time to screen an entire class. We used these small-group norms to help us to identify and set intervention goals for students who needed extra classroom academic support. We also recognize that use of these informal group norms should be restricted to general-education Tier 1 problem-solving."*
Criterion-Referenced Performance Goal. Proficiency-based performance goals can be described as 'criterion-referenced' when they link to important academic skills and have clear definitions of 'mastery' but are not backed by research-based or local norms. This proficiency level may be created by the teacher; may reflect a school-, district-, or state-defined standard; or may be derived from other sources of expert opinion.	Appropriate Use(s) for This Performance Data Source: Criterion-referenced goals are applicable to all grade levels, can be applied to virtually all academic content areas, and can be employed in both general- and special-education settings. They are most useful when developing performance expectations either for short-term academic sub-skills that the student may attain in a matter of weeks (e.g., recognition of all mixed-case letters) or for academic-skill targets for which no local or research norms are	*"We developed our own criterion-referenced performance goals for this student because there were no research-based or local norms available for the academic skill that we were measuring. We believe that the standards*

Criterion-referenced performance goals are often linked to the assessment of discrete academic sub-skills that may be mastered in a few days or weeks. For example, a teacher may decide that, in his classroom, students must be able to correctly answer at least 20 math fact problems (single-digit times single-digit) within 3 minutes to be proficient (teacher-developed standard). Criterion-referenced goals may also be used to gauge student progress over longer periods, such as a full school year. For example, a district may include a curriculum expectation that, by the end of grade 1, students will know all elements of a preselected set of sight words taken from the Dolch Word List (district standard). Sometimes criterion-reference goals include *cutscores* that indicate when a student has attained mastery. For example, a science instructor may assess students' knowledge of 50 key biology terms and provide additional instructional and intervention support to students who know fewer than 90 percent of those terms (teacher-developed standard; 90% cutscore).	available. Limitations of This Performance Data Source: A significant limitation of criterion-referenced goals is that they are based largely on the 'expert opinion' of teachers, curriculum writers, and other sources—rather than being derived empirically from research-based or local norms. In any individual case in which criterion-referenced goals are used, it is likely to be unclear how the target student is performing relative to other students in his or her local or national peer group or even whether that student's falling short of these goals is actually predictive of academic failure. It is recommended, then, that criterion-referenced goals be used only when higher-quality research-based or local norms cannot be obtained.	*for mastery that we developed for the student are both ambitious and realistic. However, we also recognize that we lack information both about the degree to which this student's peers have mastered these criterion-referenced goals and about how strongly these goals might correlate with other measures of long-term academic success."*

When ACQUISITION is the Target: How to Set Individual Student Academic Goals

The focus of classroom interventions is often to help students to acquire a fixed set of academic-skill items (e.g., naming numbers 1-10). When the intervention supports the acquisition of a finite set of items, timelines tend to be short (e.g., 1-8 weeks) and the goal is typically mastery of all items in the academic-item set. Here are the steps to follow in defining a student goal to acquire a limited set of academic items:

1. Select a Set of Academic Items as the Intervention Target. The teacher decides on a finite set, or 'pool', of academic items to be targeted in the intervention. Examples of possible academic-item sets suitable for intervention are naming of all mixed-case letters; answering 2-term multiplication math facts 0-12; and giving definitions for 20 key biology terms.

2. Establish Criteria for Item Mastery. The teacher next defines the criteria that allow him or her to judge when the student has mastered any particular item from the academic-item pool. Along with the expectation of a *correct* response, mastery criteria usually include expectations for *speed* of responding.

   Creating criteria for determining item mastery is useful because these criteria allow the teacher both to be more consistent and to have greater confidence in judging whether a particular item has been mastered.

   As an example of criteria for item mastery, a first-grade teacher decides that mastery on a mixed-case letter-naming intervention should be defined as: "When shown a flash-card with an upper- or lower-case letter, the student will correctly name the letter within 3 seconds." To cite a second example, a high-school science teacher whose intervention is intended to promote definitions of 20 key biology terms defines mastery as follows: "When shown a biology term, the student will correctly state the definition orally within 10 seconds."

3. Collect Baseline Data. Before beginning the intervention, the teacher determines the student's baseline level of performance. The easiest way to collect baseline data is to present each of the items from the item-pool to the student in random order, have the student respond, apply the mastery criteria (developed in the previous step) to determine whether each item is correct or incorrect, and record the student's responses.

   For example, a first-grade teacher collects baseline data by showing her student flash-cards with all 52 mixed-case letters while applying her mastery criteria: The teacher sorts each card whose letter the student can correctly name within 3 seconds into a 'known' pile and sorts into an 'unknown' pile those flash-cards that the student identifies incorrectly or hesitates in responding beyond 3 seconds. At the end of the session, the teacher tallies the student's responses and discovers that at baseline he can correctly identify 38 of a possible 52 mixed-case letters.

   TIP: If a student tends to have a high degree of variability in responding—e.g., on some days the student answers items correctly and on other days he or she gets those same items wrong—the teacher may want to inventory the student's skills across 2-3 successive days and count as 'known' for baseline only those items the student can correctly answer across all sessions.

4. Set an Intervention Exit Goal. The teacher next sets a student exit goal that defines a successful intervention. In most cases, the teacher will probably decide that the intervention is to be judged a success when the student

has met the standard for mastery on all items in the academic- item pool. For example, a high school science teacher may set, as an intervention exit goal, that a student will be able to correctly define all of the items from a list of 20 key biology terms.

Occasionally, however, the teacher may decide that an alternative outcome goal is acceptable. For example, a fourth-grade teacher may set as an exit goal that a student whose intervention focuses on 2-term multiplication facts 0-12 will be able to answer at least 90 percent of those math facts correctly. In this teacher's judgment, 90 percent proficiency on this collection of math facts will permit the student to experience sufficient success on math class- and homework to discontinue the intervention.

5. Decide on the Frequency and Session Length of the Intervention. The teacher decides how long each intervention session is to last and how many intervention sessions the student will receive per week. For students with mild academic deficits, intervention sessions can be as short as 20 minutes per day, 3 days per week. For students with greater deficits, intervention sessions may last 30-45 minutes per session and occur as often as 4-5 days per week.

6. Set a Timespan for the Intervention. The teacher estimates the number of instructional weeks the intervention should be attempted and sets an end-date by which the student is predicted to attain success. An intervention that targets the student's acquisition of a specific set of academic items is typically of short duration: between 1 and 8 instructional weeks.

   However, predicting long an acquisition intervention should last is more of an art than a science. The teacher must exercise professional judgment, selecting a timespan that is both ambitious *and* realistic. Also, the frequency and session length of a particular intervention will affect the timespan. For example, a student whose intervention is scheduled at a higher 'dosage' (e.g., daily for 40-minute sessions) can be expected to reach the exit goal faster than a similar student whose intervention is scheduled at a lower 'dosage' (e.g., 3 times per week for 20-minute sessions).

7. Monitor the Student's Progress. Throughout the intervention, the teacher can monitor the student's progress periodically (e.g., weekly or even more frequently) by having the student attempt all of the items in the item-pool and recording the results.

   For example, the first-grade teacher whose intervention targets a student's letter-naming skills for mixed-case letters measures her student's progress by reviewing all 52 letter flash-cards once per week and, each time, tracking the number of letters that the student is able to name correctly within 3 seconds of being shown the flash-card.

   As a second example, the high school science teacher working with a student on acquiring 20 key biology terms and their definitions ends each intervention session by having the student attempt to define all terms, with each vocabulary word counted as correct if the student defines it correctly within 10 seconds.

References

Burns, M. K., & Gibbons, K. A. (2008). *Implementing response-to-intervention in elementary and secondary schools.* Routledge: New York.

- *Academic Skills: Cumulative Mastery Log*. During academic interventions in which the student is presented with specific items such as math facts or spelling words, the instructor can track the impact of the intervention by recording and dating mastered items in a cumulative log.

  First, the instructor defines the set of academic items to be taught or reviewed during the intervention (e.g., basic multiplication facts from 1-12; pre-primer Dolch Word list; vocabulary terms for biology course). Next, the instructor sets criteria for judging when the student has mastered a particular item from the academic item set. (Example: "A math fact is considered mastered when the student successfully answers that math-fact flashcard within 3 seconds on three successive occasions during a session and repeats this performance without error across two successive sessions.").

  To collect baseline information, the instructor reviews all items from the academic-item set with the student, noting which items the student already knows. Then, throughout the intervention, the instructor logs and dates any additional items that the student masters.

  NOTE: The Academic Intervention: Cumulative Mastery Log that appears on the following pages structures the task of setting up and using a mastery log to track the cumulative results of an academic intervention.

  Example: Mrs. Ostrowski, a 1st-grade teacher, decides to provide additional intervention support for Jonah, a student in her class who does not have fluent letter recognition skills. Before starting an intervention, she inventories and records Jonah's baseline skills—noting that Jonah can fluently and accurately recognize 18 upper-case letters and 14 lower-case letters from the English alphabet. She sets as an intervention goal that Jonah will master all remaining items –8 upper-case and 12 lower-case letters—within four weeks.

  Mrs. Ostrowski then begins the daily intervention (incremental rehearsal of letters using flashcards). Whenever Jonah is able fluently and accurately to name a previously unknown letter, the teacher records and dates that item in her cumulative mastery log.

Academic Intervention: Cumulative Mastery Log

Student: _____ School Yr: _____ Classroom/Course: _____

Academic Item Set: Define the set of academic items to be measured (e.g., basic multiplication facts from 1-12; pre-primer Dolch Word list; vocabulary terms for biology course):

_____

_____

Criteria for Mastery: Describe the criteria for judging when the student has mastered a particular item from the academic item set. (Example: *"A math fact is considered mastered when the student successfully answers that math-fact flashcard within 3 seconds on three successive occasions during a session and repeats this performance without error across two successive sessions."*):

_____

_____

Baseline Skills Inventory: Prior to beginning the intervention, inventory the student's current level of mastery of the skill being measured. (NOTE: Apply the 'criteria for mastery' guidelines written above when completing the baseline skills inventory.)
Person completing the inventory: _____ Date: _____/_____/_____

Item 1: _____	Item 11: _____	Item 21: _____
Item 2: _____	Item 12: _____	Item 22: _____
Item 3: _____	Item 13: _____	Item 23: _____
Item 4: _____	Item 14: _____	Item 24: _____
Item 5: _____	Item 15: _____	Item 25: _____
Item 6: _____	Item 16: _____	Item 26: _____
Item 7: _____	Item 17: _____	Item 27: _____
Item 8: _____	Item 18: _____	Item 28: _____
Item 9: _____	Item 19: _____	Item 29: _____
Item 10: _____	Item 20: _____	Item 30: _____

Academic Intervention: Cumulative Mastery Log

Student: _____ School Yr: _____ Classroom/Course: _____

Cumulative Mastery Log: During the intervention, log each mastered item below with date of mastery. NOTE: Be sure to use the 'criteria for mastery' defined on the first page of this form when judging whether the student has mastered a particular item.

Item 1: _____ Date: ___/___/___	Item 21: _____ Date: ___/___/___
Item 2: _____ Date: ___/___/___	Item 22: _____ Date: ___/___/___
Item 3: _____ Date: ___/___/___	Item 23: _____ Date: ___/___/___
Item 4: _____ Date: ___/___/___	Item 24: _____ Date: ___/___/___
Item 5: _____ Date: ___/___/___	Item 25: _____ Date: ___/___/___
Item 6: _____ Date: ___/___/___	Item 26: _____ Date: ___/___/___
Item 7: _____ Date: ___/___/___	Item 27: _____ Date: ___/___/___
Item 8: _____ Date: ___/___/___	Item 28: _____ Date: ___/___/___
Item 9: _____ Date: ___/___/___	Item 29: _____ Date: ___/___/___
Item 10: _____ Date: ___/___/___	Item 30: _____ Date: ___/___/___
Item 11: _____ Date: ___/___/___	Item 31: _____ Date: ___/___/___
Item 12: _____ Date: ___/___/___	Item 32: _____ Date: ___/___/___
Item 13: _____ Date: ___/___/___	Item 33: _____ Date: ___/___/___
Item 14: _____ Date: ___/___/___	Item 34: _____ Date: ___/___/___
Item 15: _____ Date: ___/___/___	Item 35: _____ Date: ___/___/___
Item 16: _____ Date: ___/___/___	Item 36: _____ Date: ___/___/___
Item 17: _____ Date: ___/___/___	Item 37: _____ Date: ___/___/___
Item 18: _____ Date: ___/___/___	Item 38: _____ Date: ___/___/___
Item 19: _____ Date: ___/___/___	Item 39: _____ Date: ___/___/___
Item 20: _____ Date: ___/___/___	Item 40: _____ Date: ___/___/___

Setting Individual RTI Academic Performance Goals for the *Off-Level* Student Using Research Norms

Students with *significant* academic deficits can present particular challenges as teachers attempt to match them to appropriate RTI supplemental academic interventions. Often, these Tier 2/3 interventions are 'off-level'; that is, they target academic skills that are below the student's grade placement.

It might be a mistake, however, to measure the student using only assessments from the student's grade of record if that student has significant academic delays. 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.

First, it should be acknowledged that goal-setting is an essential part of any student's RTI intervention plan. To set a goal for student academic performance, these elements are needed:

- *The student's baseline academic performance.* Prior to starting the intervention, the teacher calculates baseline performance by assessing the target student several times with the academic measure that will be used to measure that student's progress once the intervention begins.
- *Estimate of 'typical' peer performance.* The teacher has a reliable estimate of expected or typical peer performance on the academic measure that will be used to measure the target student's progress.
- *Estimate of expected weekly progress.* The teacher selects a rate of weekly academic progress that the target student is expected to attain if the intervention is successful.
- *Number of weeks for the intervention trial.* The teacher decides on how many weeks the RTI intervention will last, as the cumulative, final academic goal can be calculated only when the entire timespan of the intervention is known.

The remainder of this article describes how the formulation of academic goals 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 academic deficits, 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 & Jones, 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 grade level 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. 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 at Grade 2 on the fall screening norms (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 2 additional WRC per week on intervention, Randy should close the gap within about 8 instructional weeks.

6. Gradually 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, the teacher reassesses 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

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Shapiro, E. S. (2008). Best practices in setting progress-monitoring monitoring goals for academic skill improvement. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology V* (pp. 141-157). Bethesda, MD: National Association of School Psychologists.

Tindal, G., Hasbrouck, J., & Jones, C. (2005).Oral reading fluency: 90 years of measurement [Technical report #33]. Eugene, OR: University of Oregon. (NOTE: A useful summary of these reading fluency norms can also be downloaded from http://www.gifted.uconn.edu/SEMR/oralreadingfluency%20norms.2005.pdf)

Teacher-Friendly Methods to Monitor Tier 1 (Classroom) Interventions	NOTES
Teacher Directions: Review the methods below for collecting progress-monitoring data to evaluate Tier 1 (classroom) interventions. Select one or more of these methods to monitor your student.	
❑ *Existing data*. The teacher uses information already being collected in the classroom or school that is relevant to the identified student problem. Examples of existing data include grades, attendance/tardy records, office disciplinary referrals, homework completion. NOTE: Existing data is often not sufficient alone to monitor a student on intervention but can be a useful *supplemental* source of data on academic or behavioral performance.	
❑ *Global skill checklist*. The teacher selects a global skill (e.g., homework completion; independent seatwork). The teacher then breaks the global skill down into a checklist of component sub-skills--a process known as 'discrete categorization' (Kazdin, 1989). An observer (e.g., teacher, another adult, or even the student) can then use the checklist to note whether a student successfully displays each of the sub-skills on a given day. Classroom teachers can use these checklists as convenient tools to assess whether a student has the minimum required range of academic enabling skills for classroom success. Teachers or tutors may also want to review these checklists with students and encourage them to use the checklists independently to take greater responsibility for their own learning.	
❑ *Behavioral Frequency Count/Behavioral Rate. In* a behavioral frequency count, an observer (e.g., the teacher) watches a student's behavior and keeps a cumulative tally of the number of times that the behavior is observed during a given period. Behaviors that are best measured using frequency counts have clearly observable beginning and end points—and are of relatively short duration. Examples include student call-outs, requests for teacher help during independent seatwork, and raising one's hand to make a contribution to large-group discussion. Teachers can collect data on the frequency of observed student behaviors during a class period in several ways: (1) by keeping a cumulative mental tally of the behaviors; (2) by recording behaviors on paper (e.g., as tally marks) as they occur; or (3) using a golf counter or other simple mechanical device to record observed behaviors. When multiple observations are made of student behaviors, those observations often last for differing periods of time. One method to standardize the results of observations conducted over varying timespans is to convert the results of each observation to a behavioral *rate* (behaviors divided by the length of the observation). To compute a behavioral rate, the observer (1) sums the total number of behaviors observed and (2) divides the total number of behaviors observed by total minutes in the observation period. The resulting figure represents a standardized 'behaviors observed per minute' and can be compared directly to student behavior rates observed at other times. For example, an observer may have noted that a student engaged in 5 call-outs during a 10-minute observation period. The observer then divides the 5 callouts by the 10 minute observation timespan to compute a standardized behavior rate of *0.5 callouts per minute*.	

Teacher-Friendly Methods to Monitor Tier 1 (Classroom) Interventions (Cont.)	NOTES
❑ *Rating scales*. A scale is developed with one or more items that a rater can use to complete a global rating of a behavior. Often the rating scale is completed at the conclusion of a fixed observation period (e.g., after each class period; at the end of the school day). Here is an example of a rating scale item: *Brian focused his attention on teacher instructions, classroom lessons and assigned work. 1=Poor; 2=Fair; 3=Good.* NOTE: One widely used example of rating scales routinely used in classrooms is the daily behavior report (DBR) (Chafouleas, Riley-Tillman & Sugai, 2007). The teacher completes a 3- to 4-item rating scale each day evaluating various target student behaviors. Teachers can also create their own customized Daily Behavior Reports online. The *Behavior Reporter* is a free web-based application that allows educators to select and edit existing behavior rating items from a database or to write their own. This application can be accessed at: http://www.interventioncentral.org.	
❑ *Academic Skills: Cumulative Mastery Log*. During academic interventions in which the student is presented with a specific and limited pool of items (e.g., vocabulary terms for a biology course or entries in the Periodic Table of the Elements for a chemistry course), the instructor can track the impact of the intervention by recording and dating mastered items in a cumulative log. First, the instructor defines the set of academic items to be taught or reviewed during the intervention. Next, the instructor sets criteria for judging when the student has mastered a particular item from the academic item set. (Example: "A biology vocabulary item is considered mastered when the student supplies the correct definition within 3 seconds of being shown the term on a flashcard."). To collect baseline information, the instructor reviews all items from the academic-item set with the student, recording items the student already knows. Then, throughout the intervention, the instructor logs and dates additional items as they are mastered by the student.	

Teacher-Friendly Methods to Monitor Tier 1 (Classroom) Interventions (Cont.)	NOTES
❑ *Work Products.* Student work products can be collected and evaluated to judge whether the student is incorporating information taught in the course, applying cognitive strategies that they have been taught, or remediating academic delays. Examples of work products are math computation worksheets, journal entries, and written responses to end-of-chapter questions from the course textbook. Whenever teachers collect academic performance data on a student, it is recommended that they also assess the performance of typical peers in the classroom. Peer performance information allows the teacher directly to estimate and to track the skill gap that separates the target student from others in the class who are not having academic difficulties. Teachers should select students to serve as 'comparison peers' whose skills represent the class average. Work products can be assessed in several ways to yield objective numeric data, depending on the nature of the identified student problem. The teacher can estimate the percentage of work completed on an assignment, for example, as well as the accuracy of the work actually completed. Additionally, the instructor may decide to rate the student's work for quality, using a rubric or other qualitative evaluation approach.	
❑ *Behavior Log.* Behavior logs are narrative 'incident reports' that the teacher records about problem student behaviors. Behavior logs are most useful for tracking problem behaviors that are serious but do not occur frequently. The teacher makes a log entry each time that a behavior is observed. An advantage of behavior logs is that they can provide information about the context within which a behavior occurs.(Disciplinary office referrals are a specialized example of a behavior log.) A behavior log would typically note the date, start time, and end time of a behavioral incident, a brief narrative of the incident (including people involved, the activity, possible triggers to the student problem behavior, a description of the student problem behavior, and the outcome of the incident).	

Teacher-Friendly Methods to Monitor Tier 1 (Classroom) Interventions (Cont.)	NOTES
❑ *Curriculum-Based Measurement*. Curriculum-Based Measurement (CBM) is a family of brief, timed measures that assess basic academic skills. CBMs have been developed to assess a considerable number of academic competencies, including oral reading fluency, reading comprehension, math computation, and written expression. Among advantages of using CBM for classroom assessment are that these measures are quick and efficient to administer; align with the curriculum of most schools; have good 'technical adequacy' as academic assessments; and use standard procedures to prepare materials, administer, and score (Hosp, Hosp & Howell, 2007). NOTE: Schools can find a comprehensive web directory of free or low-cost Curriculum-Based Measurement resources on CBM Warehouse at: http://www.interventioncentral.org/index.php/cbm-warehouse	

References

Chafouleas, S., Riley-Tillman, T.C., & Sugai, G. (2007). School-based behavioral assessment: Informing intervention and instruction. New York: Guilford Press.

Hosp, M. K., Hosp, J. L., & Howell, K. W. (2007). *The ABCs of CBM*. New York: Guilford Press.

Kazdin, A. E. (1989). *Behavior modification in applied settings* (4th ed.). Pacific Gove, CA: Brooks/Cole.

Selected Research-Based Norms for Academic Skills and Related Behaviors

The research norms below are drawn from a range of published sources. RTI Teams consulting these norms should consider the source and quality of the data when using them to calculate 'typical' rates of student performance.

Curriculum-Based Measurement: Oral Reading Fluency (Tindal, Hasbrouck, & Jones, 2005)			
	Correctly Read Words Per Minute		
Grade	*Fall*	*Winter*	*Spring*
1	NA	23	53
2	51	72	89
3	71	92	107
4	94	112	123
5	110	127	139
6	127	140	150
7	128	136	150
8	133	146	151
Comments: These multi-state norms are based on a large sample size and are among the best research norms available for oral reading fluency.			

Curriculum-Based Measurement: Math Computation (Adapted from Deno & Mirkin, 1977)		
Grade	Digits Correct in 2 Minutes	Digits Incorrect in 2 Minutes
1-3	20-38	6-14
4 & Up	40-78	6-14
Comments: These math computation norms are still widely referenced. However, the norms were collected nearly 30 years ago and may not be widely representative because they were drawn from a relatively small sample of students. Additionally, the norms make no distinction between easy and more challenging math computation problem types. Because of these limitations, these norms are best regarded as a rough indicator of 'typical' student math computation skills.		

Curriculum-Based Measurement: Writing (Mirkin, Deno, Fuchs, Wesson, Tindal, Marston, & Kuehnle,1981)	
Grade	Total Words Written in 3 Minutes
1	15
2	28
3	37
4	41
5	49
6	53
Comments: These research norms in writing are still among the few that have been published. While they can be useful as a general starting point for estimating 'typical' writing skills, these norms also have limitations: they are somewhat dated, were based on a relatively small sample size, and apply only to one area of CBM writing-- 'total words written'.	

CBM-Math Computation Fluency Norms: Correct Digits (Intervention & Retention Levels)

How to Use This Chart. The chart below provides fluency norms for grades 2-5, using Curriculum-Based Measurement Math Computation (CBM-Math Computation) measures. CBM-Math Computation probes are brief, timed (2-minute) computation worksheets that can be administered to groups of students under standardized conditions.

Student fluency norms are presented in this table as 'digits correct per minute'.

Use the 'Intervention' column(s) to evaluate student performance on computation probes at the student's current instructional level. Use the 'Retention' column(s) to evaluate student performance on computation probes that the student has previously mastered.

To estimate 'typical' student performance at each grade level, consult the 'Median' columns. To see the range of 'typical' performance at each grade level, use the 'Instructional Range' columns.

Table: CBM-Math Computation Fluency Norms: Correct Digits (Intervention & Retention Levels)

Grade	Intervention Probes Median-Digits Correct Per Min	Intervention Probes Instructional Range- Digits Correct Per Min (± 1 SD)	Retention Probes Median- Digits Correct Per Min	Retention Probes Instructional Range- Digits Correct Per Min (± 1 SD)
2	15	9↔21	23	11↔35
3	37	22↔52	17	11↔23
4	45	28↔62	30	20↔40
5	26	15↔37	36	25↔47

Source: VanDerHeyden, A. M., & Burns, M. K. (2009). Performance indicators in math: Implications for brief experimental analysis of academic performance. *Journal of Behavioral Education, 18*, 71-91.

CBM-Writing Norms: Total Words/Correctly Spelled Words/Correct Word Sequences

How to Use This Chart. The chart below provides fluency norms for grades 1-5, using Curriculum-Based Measurement Writing (CBM-Writing) measures. CBM-Writing probes are brief, timed (3-minute) writing samples that can be administered to groups of students under standardized conditions. To estimate 'typical' student performance at each grade level, consult the 'Median' columns. To see the range of 'typical' performance at each grade level, use the 'Instructional Range' columns.

Table: CBM-Writing Norms: Total Words/Correctly Spelled Words/Correct Word Sequences

Grade	Total Words Median	Total Words Instructional Range (± 1 SD)	Correctly Spelled Words Median	Correctly Spelled Words Instructional Range (± 1 SD)	Correct Word Sequences Median	Correct Word Sequences Instructional Range (± 1 SD)
1	28	18↔38	24	14↔34	17	7↔27
2	33	23↔43	30	20↔40	22	13↔31
3	39	28↔50	37	26↔48	28	19↔37
4	45	30↔60	44	29↔59	35	22↔48
5	48	33↔63	47	32↔62	38	24↔52

Source: Gansle, K. A., VanDerHeyden, A. M., Noell, G. H., Resetar, J. L., & Williams, K. L. (2006). The technical adequacy of curriculum-based and rating-based measures of written expression for elementary school students. *School Psychology Review, 35*, 435-450.

School Attendance: Rates of Absenteeism (National Center for Educational Statistics, 2005)	
Grade	Days of School Missed Per Month
All Grades (K-12)	80% of students in a large national sample missed *no more than* 2 days of school per month.
Comments: These attendance norms were compiled from a large data set. They are a reliable yardstick for estimating 'typical' rates of student attendance.	

Time on Task (Anderson, 1976; Gettinger, 1985)	
Grade	Time on Task
All Grades (K-12)	80% or more [estimated]
Comments: There are few reliable norms for the amount of 'on-task' behavior a student must show in the classroom to have an optimal chance for success. The issue is further complicated because existing studies of typical rates of 'time on task' often fail to distinguish between passive academic engagement (student simply looking at the teacher) and student active academic engagement (student actively showing what they have learned through involvement in observable activities). There is little disagreement, though, that students need to attend to instruction in order to learn. Therefore, RTI Teams are encouraged to set a goal of at least 80% on task (counting both passive and active student engagement).	

References

Anderson, L. (1976). An empirical investigation of individual Differences in time to learn. *Journal of Educational Psychology*, 68, 226-233.

Deno, S.L., & Mirkin, P.K. (1977). Data-based program modification: A manual. Reston, VA: Council for Exceptional Children.

Gettinger, M. (1985). Time allocated and time spent relative to time needed for learning as determinants of achievement. *Journal of Educational Psychology*, 77(1), 3-11.

Mirkin,P.K., Deno, S.L., Fuchs, L., Wesson, C.,Tindal, G., Marston, D., & Kuehnle, K. (1981). Procedures to develop and monitor progress on IEP goals. Minneapolis: University of Minnesota, Institute for Research on Learning Disabilities.

National Center for Education Statistics. (2005). Student effort and academic progress. Retrieved December 18, 2006, from http://nces.ed.gov/programs/coe/2006/section3/indicator24.asp#info

Tindal, G., Hasbrouck, J., & Jones, C. (2005). Technical report #33: Oral reading fluency: 90 years of measurement. Behavioral Research and Teaching ,University of Oregon, College of Education. Retreived December 28, 2006, from http://brt.uoregon.edu/techreports/ORF_90Yrs_Intro_TechRpt33.pdf

Documenting Tier 1 (Classroom) Interventions: A Sample Form

When general-education students begin to struggle with academic or behavioral issues, the classroom teacher will typically select and implement one or more evidence-based intervention strategies to assist those students. But a strong intervention plan needs more than just well-chosen interventions. It also requires 4 additional components (Witt, VanDerHeyden, & Gilbertson, 2004): (1) student concerns should be clearly and specifically defined; (2) one or more methods of formative assessment should be used to track the effectiveness of the intervention; (3) baseline student data should be collected prior to the intervention; and (4) a goal for student improvement should be calculated before the start of the intervention to judge whether that intervention is ultimately successful. If a single one of these essential 4 components is missing, the intervention is to be judged as fatally flawed (Witt, VanDerHeyden, & Gilbertson, 2004) and as not meeting minimum RTI standards.

Teachers need a standard format to use in documenting their 'Tier 1' (classroom) intervention plans. The attached form, *Tier 1/Classroom Intervention Planning Sheet*, is designed to include all of the essential RTI elements of an effective intervention plan. The form includes space to document:

- *Definition of up to two student academic or behavioral problems*. The most significant step in selecting an effective classroom intervention is to correctly identify the target student concern(s) in clear, specific, measureable terms (Bergan, 1995). The teacher selects no more than two student concerns to address on the intervention plan.
- *Intervention description.* The teacher describes the evidence-based intervention(s) that will be used to address the identified student concern(s).
- *Intervention delivery.* The teacher writes down details necessary for implementing the intervention in the classroom (e.g., where and when the intervention will be used; the adult-to-student ratio; how frequently the intervention will take place; the length of time each session of the intervention will last; materials needed for the intervention, etc.
- *Checkup date.* The teacher notes the date at which the intervention will be reviewed to determine whether it has been sufficiently effective. NOTE: For academic interventions, it is advisable to allow at least 4 instructional weeks before deciding whether the intervention has been effective.
- *Assessment data.* For each intervention, the teacher selects the type(s) of classroom data that will be collected formatively throughout the intervention period to judge its effectiveness. For each data source, in turn, the teacher collects baseline data on student performance—and calculates an outcome goal that the student is expected to attain if the intervention is successful. (During the period in which the intervention is in effect, the teacher collects ongoing data to judge student performance and attaches that data to the classroom intervention documentation form.)

While a Tier 1/classroom intervention documentation form is a helpful planning tool, schools should remember that teachers will need other resources and types of assistance as well to be successful in selecting and using Tier 1 interventions. For example, teachers should have access to an 'intervention menu' that contains evidence-based strategies to address the most common academic and behavioral concerns and should be able to get coaching support as they learn how to implement new classroom intervention ideas. A future blog entry will review necessary Tier 1 teacher supports in greater detail.

References

Bergan, J. R. (1995). Evolution of a problem-solving model of consultation. *Journal of Educational and Psychological Consultation, 6(2),* 111-123.

Witt, J. C., VanDerHeyden, A. M., & Gilbertson, D. (2004). Troubleshooting behavioral interventions. A systematic process for finding and eliminating problems. *School Psychology Review, 33*, 363-383.

Tier 1/Classroom Intervention Planning Sheet

Teacher/Team: _____ Date: _____ Student: _____

Student Problem Definition #1: _____

Student Problem Definition #2: _____

[Optional] Person(s) assisting with intervention planning process: _____

Interventions: Essential Elements (Witt et al., 2004)

- Clear problem-definition(s)
- Baseline data
- Goal for improvement
- Progress-monitoring plan

Intervention Description	Intervention Delivery	Check-Up Date	Assessment Data
Describe each intervention that you plan to use to address the student's concern(s).	List key details about delivery of the intervention, such as:; (1) where & when the intervention will be used; (2) the adult-to-student ratio; (3) how frequently the intervention will take place; (4) the length of time each session of the intervention will last;.	Select a date when the data will be reviewed to evaluate the intervention.	Note what classroom data will be used to establish baseline, set a goal for improvement, and track the student's progress during this intervention.
			Type(s) of Data to Be Used:
			Baseline / Goal by Check-Up
			Type(s) of Data to Be Used:
			Baseline / Goal by Check-Up
		.	Type(s) of Data to Be Used:
			Baseline / Goal by Check-Up

Witt, J. C., VanDerHeyden, A. M., & Gilbertson, D. (2004). Troubleshooting behavioral interventions. A systematic process for finding and eliminating problems. *School Psychology Review, 33*, 363-383.

How To: Structure Classroom Data Collection for Individual Students

When a student is struggling in the classroom, the teacher will often implement an intervention matched to the student's deficient academic skills. However, classroom interventions are incomplete if the teacher is not also collecting data to document whether those interventions are actually benefiting students. Indeed, an intervention can be viewed as 'fatally flawed' (Witt, VanDerHeyden & Gilbertson, 2004) if it lacks any one of these 4 data elements:

- *Problem definition.* The teacher clearly and specifically defines the presenting student problem(s) needing intervention. If the student problem is not clearly defined, the teacher cannot accurately measure or fix it.

- *Baseline performance.* The teacher assesses the student's current skill or performance level (baseline performance) in the identified area(s) of concern. If the teacher lacks baseline information, he or she cannot judge at the end of the intervention how much progress was actually made.

- *Intervention goal.* Before starting the intervention, the teacher sets a specific outcome goal for student improvement. Without a goal in place before the start of the intervention, the teacher cannot judge at the end of the intervention whether it has in fact been a success.

- *Ongoing progress-monitoring.* The teacher selects a method to monitor the student's progress formatively during the intervention. Without ongoing monitoring of progress, the teacher is 'flying blind', unable to judge to judge whether the intervention is effective in helping the student to attain the outcome goal..

Bringing Structure to Classroom Data-Collection. The *Student Intervention: Monitoring Worksheet*. As teachers take on the role of 'first responder' interventionist, they are likely to need guidance – at least initially—in the multi-step process of setting up and implementing classroom data collection, as well as interpreting the resulting data.

A form designed to walk teachers through the data-collection process-- The *Student Intervention: Progress-Monitoring Worksheet*—appears at the end of this document, along with a completed example. The *Worksheet* is a 7-step 'wizard' form to show teachers how to structure their progress-monitoring to ensure that their data collection is adequate to the task of measuring the impact of their classroom interventions:

A. *Identify the student problem*. The teacher defines the student problem in clear, specific terms that allow the instructor to select an appropriate source of classroom assessment to measure and monitor the problem.

B. *Decide on a data collection method*. The teacher chooses a method for collecting data that can be managed in the classroom setting and that will provide useful information about the student problem. Examples of data collection methods are curriculum-based measurement (e.g., oral reading fluency; correct writing sequences), behavior-frequency counts, and daily behavior report cards. When selecting a data collection method, the teacher also decides how frequently that data will be collected during intervention progress-monitoring. In some cases, the method of data collection being used will dictate monitoring frequency. For example, if homework completion and accuracy is being tracked, the frequency of data collection will be equal to the frequency of homework assignments. In other cases, the level of severity of the student problem will dictate monitoring frequency. In schools implementing Response to Intervention (RTI), students on Tier 2 (standard-protocol) interventions should be monitored 1-2 times per month, for example, while students on Tier 3 (intensive problem-solving protocol) interventions should be monitored at least

weekly (Burns & Gibbons, 2008).

C. *Collect data to calculate baseline*. The teacher should collect 3-5 data-points prior to starting the intervention to calculate the student's baseline, or starting point, in the skill or behavior that is being targeted for intervention. The student's baseline performance serves as an initial marker against which to compare his or her outcome performance at the end of the intervention. (Also,--because baseline data points are collected prior to the start of the intervention--they collectively can serve as an prediction of the trend, or rate of improvement, if the student's current academic program were to remain unchanged with no additional interventions attempted.). In calculating baseline, the teacher has the option of selecting the median, or middle, data-point, or calculating the mean baseline performance.

D. *Determine the timespan of the intervention*. The length of time reserved for the intervention should be sufficient to allow enough data to be collected to clearly demonstrate whether that intervention was successful. For example, it is recommended that a high-stakes intervention last at least 8 instructional weeks (e.g., Burns & Gibbons, 2008).

E. *Set an intervention goal*. The teacher calculates a goal for the student that, if attained by the end of the intervention period, will indicate that the intervention was successful.

F. *Decide how student progress is to be summarized*. A decision that the teacher must make prior to the end of the intervention period is how he or she will summarize the actual progress-monitoring data. Because of the variability present in most data, the instructor will probably not elect simply to use the single, final data point as the best estimate of student progress. Better choices are to select several (e.g. 3) of the final data points and either select the median value or calculate a mean value. For charted data with trendline, the teacher may calculate the student's final performance level as the value of the trendline at the point at which it intercepts the intervention end-date.

G. *Evaluate the intervention outcome*. At the conclusion of the intervention, the teacher directly compares the actual student progress (summarized in the previous step) with the goal originally set. If actual student progress meets or exceeds the goal, the intervention is judged to be successful.

References

Burns, M. K., & Gibbons, K. A. (2008). Implementing *response-to-intervention in elementary and secondary schools*. Routledge: New York.

Witt, J. C., VanDerHeyden, A. M., & Gilbertson, D. (2004). Troubleshooting behavioral interventions. A systematic process for finding and eliminating problems. *School Psychology Review, 33*, 363-383.

Student Intervention: Progress-Monitoring Worksheet

Student: Brian Jones Teacher: Mrs. Braniff Classroom or Course: Gr 3

SET-UP

A. Identify the Student Problem: Describe in clear, specific terms the student academic or behavioral problem:
Need to Become Fluent in Multiplication Facts: 0 to 9

B. Select a Data Collection Method: Choose a method of data collection to measure whether the classroom intervention actually improves the identified student problem (e.g., curriculum-based measurement, etc.).
Curriculum-Based Measurement: 2-Minute Timed Math Computation Probes

How frequently will this data be collected?: 1 times per Week

BASELINE

C. Collect Data to Calculate Baseline: What method from the choices below will be used to estimate the student's baseline (starting) performance? (NOTE: Generally, at least 3-5 baseline data points are recommended.)

☑ From a total of 3 observations, select the **median** value. ❑ Other: _____

❑ From a total of _____ observations, calculate the **mean** value. _____

Baseline	3. Date: 11 / 21 /2011 Obsv: 34
1. Date: 11 / 14 /2011 Obsv: 31	4. Date: / / Obsv:
2. Date: 11 / 17 /2011 Obsv: 28	5. Date: / / Obsv:

Baseline Performance: Based on the method selected above, it is calculated that the student's baseline performance is:
31 Correct Digits in 2 minutes

D. Determine Intervention Timespan: The intervention will last 6 instructional weeks and end on 1 / 13 /2012

E. Set a Performance Goal: What goal is the student expected to achieve if the intervention is successful?
At the end of the intervention, it is predicted that the student will reach this performance goal:
40 Correct Digits in 2 minutes

PROGRESS-MONITORING

F. Decide How Student Progress is to Be Summarized: Select a method for summarizing student progress ('outcome') attained when the intervention ends. S*tudent progress at the end of the intervention is to be summarized by:*

❑ Selecting the **median** value from the final ____ data-points (e.g.,3).

☑ Computing the **mean** value from the final 2 data-points (e.g.,3).

❑ [For time-series graphs]: Calculating the **value on the graph trend line** at the point that it intercepts the intervention end date.

G. Evaluate the Intervention Outcome:
At the end of the intervention, compare student progress to goal. If **actual progress** meets or exceeds **goal**, the intervention is judged successful.

The student's ACTUAL Progress (Step F) is:	42
The PERFORMANCE GOAL for improvement (Step E) is:	40

Progress-Monitoring	5. Date: 01 / 06 /2012 Obsv: 41
1. Date: 12 / 02 /2011 Obsv: 29	6. Date: 01 / 13 /2012 Obsv: 43
2. Date: 12 / 09 /2011 Obsv: 34	7. Date: / / Obsv:
3. Date: 12 / 16 /2011 Obsv: 35	8. Date: / / Obsv:
4. Date: 12 / 22 /2011 Obsv: 39	9. Date: / / Obsv:

Student Intervention: Progress-Monitoring Worksheet

Student: _____ Teacher: _____ Classroom or Course: _____

SET-UP

A. **Identify the Student Problem:** Describe in clear, specific terms the student academic or behavioral problem:

_____

B. **Select a Data Collection Method:** Choose a method of data collection to measure whether the classroom intervention actually improves the identified student problem (e.g., curriculum-based measurement, etc.).

_____

How frequently will this data be collected?: _____ times per _____

BASELINE

C. **Collect Data to Calculate Baseline:** What method from the choices below will be used to estimate the student's baseline (starting) performance? (NOTE: Generally, at least 3-5 baseline data points are recommended.)

❑ From a total of _____ observations, select the **median** value.

❑ From a total of _____ observations, calculate the **mean** value.

❑ Other: _____

Baseline	3. Date: ___/___/___ Obsv: _____
1. Date: ___/___/___ Obsv: _____	4. Date: ___/___/___ Obsv: _____
2. Date: ___/___/___ Obsv: _____	5. Date: _ _/___/___ Obsv: _____

Baseline Performance: Based on the method selected above, it is calculated that the student's baseline performance is:

_____

PROGRESS-MONITORING

D. **Determine Intervention Timespan:** The intervention will last _____ instructional weeks and end on ___/___/___.

E. **Set a Performance Goal:** What goal is the student expected to achieve if the intervention is successful?
At the end of the intervention, it is predicted that the student will reach this performance goal:

_____

F. **Decide How Student Progress is to Be Summarized:** Select a method for summarizing student progress ('outcome') attained when the intervention ends. *Student progress at the end of the intervention is to be summarized by:*

❑ Selecting the **median** value from the final ____ data-points (e.g.,3).

❑ Computing the **mean** value from the final ____ data-points (e.g.,3).

❑ [For time-series graphs]: Calculating the **value on the graph trend line** at the point that it intercepts the intervention end date.

G. **Evaluate the Intervention Outcome:** At the end of the intervention, compare student progress to goal. If **actual progress** meets or exceeds **goal**, the intervention is judged successful.

The student's ACTUAL Progress (Step F) is:	
The PERFORMANCE GOAL for improvement (Step E) is:	

Progress-Monitoring	5. Date: ___/___/___ Obsv: _____
1. Date: ___/___/___ Obsv: _____	6. Date: ___/___/___ Obsv: _____
2. Date: ___/___/___ Obsv: _____	7. Date: ___/___/___ Obsv: _____
3. Date: ___/___/___ Obsv: _____	8. Date: ___/___/___ Obsv: _____
4. Date: ___/___/___ Obsv: _____	9. Date: ___/___/___ Obsv: _____

Student: _____ Grade: _____

Teacher: School Year:

Progress-Monitoring (Cont.)

10. Date: ___/___/___ Obsv: _____
11. Date: ___/___/___ Obsv: _____
12. Date: ___/___/___ Obsv: _____
13. Date: ___/___/___ Obsv: _____
14. Date: ___/___/___ Obsv: _____
15. Date: ___/___/___ Obsv: _____
16. Date: ___/___/___ Obsv: _____
17. Date: ___/___/___ Obsv: _____
18. Date: ___/___/___ Obsv: _____
19. Date: ___/___/___ Obsv: _____
20. Date: ___/___/___ Obsv: _____
21. Date: ___/___/___ Obsv: _____
22. Date: ___/___/___ Obsv: _____
23. Date: ___/___/___ Obsv: _____
24. Date: ___/___/___ Obsv: _____
25. Date: ___/___/___ Obsv: _____
26. Date: ___/___/___ Obsv: _____
27. Date: ___/___/___ Obsv: _____
28. Date: ___/___/___ Obsv: _____
29. Date: ___/___/___ Obsv: _____

Progress-Monitoring (Cont.)

30. Date: ___/___/___ Obsv: _____
31. Date: ___/___/___ Obsv: _____
32. Date: ___/___/___ Obsv: _____
33. Date: ___/___/___ Obsv: _____
34. Date: ___/___/___ Obsv: _____
35. Date: ___/___/___ Obsv: _____
36. Date: ___/___/___ Obsv: _____
37. Date: ___/___/___ Obsv: _____
38. Date: ___/___/___ Obsv: _____
39. Date: ___/___/___ Obsv: _____
40. Date: ___/___/___ Obsv: _____
41. Date: ___/___/___ Obsv: _____
42. Date: ___/___/___ Obsv: _____
43. Date: ___/___/___ Obsv: _____
44. Date: ___/___/___ Obsv: _____
45. Date: ___/___/___ Obsv: _____
46. Date: ___/___/___ Obsv: _____
47. Date: ___/___/___ Obsv: _____
48. Date: ___/___/___ Obsv: _____
49. Date: ___/___/___ Obsv: _____

The Intervention Central Guide to…Setting Up and Interpreting Time-Series Charts

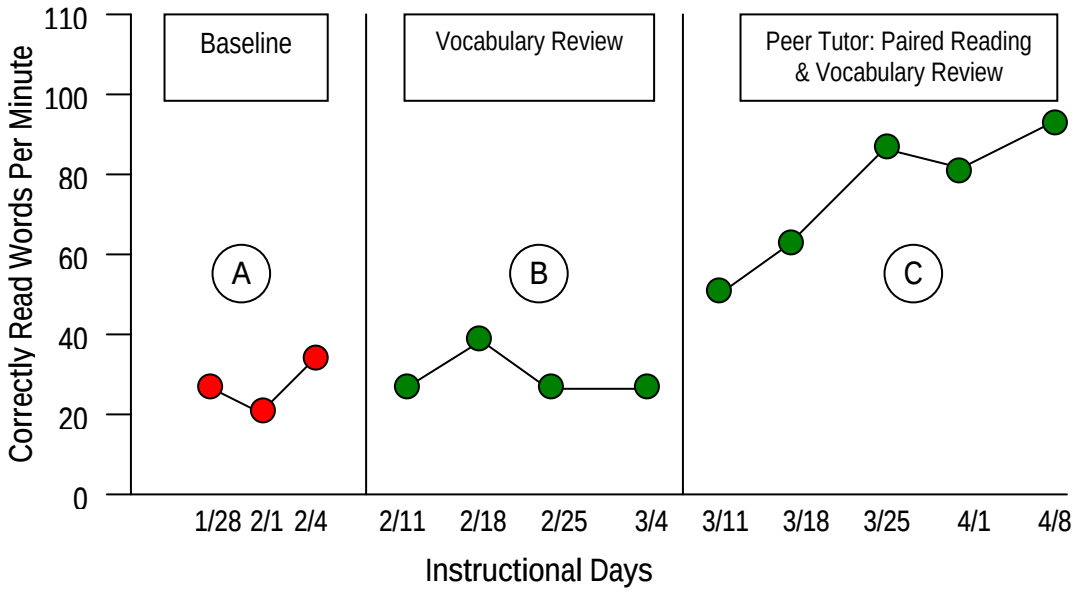
Response to Intervention requires that schools collect data on student progress over time to demonstrate whether an academic or behavioral intervention is working. It is much easier to see the student's overall rate of progress when data are converted to a visual display. The *time-series chart* is the type of visual display most commonly used to graph student progress. This brief tutorial will provide guidelines for setting up a time-series chart and interpreting plotted data (Hayes, 1981; Kazdin,1982).

Components of the time-series chart

Time-series charts are structured in a standardized manner to help viewers to better understand the data that they display. Some of the charting conventions described below (labeling of the chart axes, separation of data phases) are standard elements of time-series charts. Other conventions, such as use of aimlines, are most commonly used when charting Curriculum-Based Measurement data.

- *Labels of Vertical ('Y') and Horizontal ('X') Axes*. The vertical axis of the chart is labeled with the 'behavior' that is being measured. In the chart displayed in Figure 1, the behavior to be plotted is 'Correctly Read Words Per Minute'. The horizontal axis of the chart displays the timespan during which progress-monitoring took place. Our sample chart shows that the student was monitored from the dates of January 28 through April 8.

Figure 1: Sample Time-Series Chart With Curriculum-Based Measurement (CBM) Data



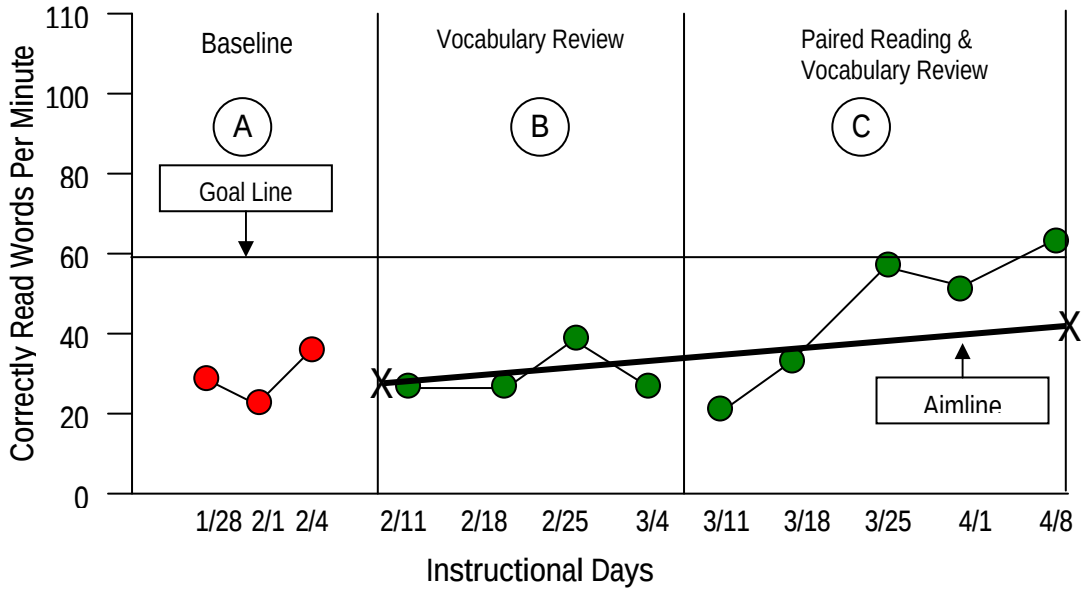
- *Phase Changes*. The chart is divided into *phases*, with each phase representing a time period in which data are collected under similar conditions. Phases are visually separated on the chart with vertical lines. Each phase is also typically labeled to indicate the intervention condition in effect during that phase (e.g., 'Baseline: Teacher whole-group math instruction'). Data

collected within a phase are plotted as a series of connected data points. However, there is always a break in the plotted data between phases to indicate that the conditions under which data were collected differed in each phase. In Figure 1, sections A, B, and C of the chart represent different phases.

- *Baseline Data*. RTI Teams will often collect *baseline* data to determine a student's starting point before an intervention is begun. Baseline data provides a snapshot of the student's level of academic or behavioral functioning before an individualized intervention is put into place. Phase A of the chart in Figure 1 shows an example of baseline data points. It is generally recommended that a minimum of 3-5 data points be collected during the baseline phase. If a visual inspection reveals that the overall trend of the baseline data is relatively flat or moving in the direction opposite that desired by school staff, the RTI Team concludes the baseline phase and implements the intervention. However, if the baseline phase shows a strong *positive* trend (moves strongly in the desired direction), the team should delay putting the intervention in place and continue to monitor student progress, since the instructional or behavioral strategies being used during the baseline phase are clearly benefiting the child.

- *Progress-Monitoring Data*. Once an individualized academic or behavioral intervention has been put into place for a student student, the RTI Team then monitors the intervention frequently (e.g., weekly) to track that student's *response* to the intervention. Sections B and C of the chart in Figure 1 display progress-monitoring data collected during two intervention phases.

Figure 2: CBM Time-Series Chart with Goal Line and Aim Line



- *Plotting Goal Line and Aimline.* When charting student progress, it is helpful to include visual indicators that show the *goal* that the student is striving to reach as well as the *expected rate of progress* that the student is predicted to make.

  The *goal line* is drawn on the chart as a vertical line that represents a successful level of performance. In Figure 2, the goal line for correctly read words is set at 59 words per minute, the typical skill level in

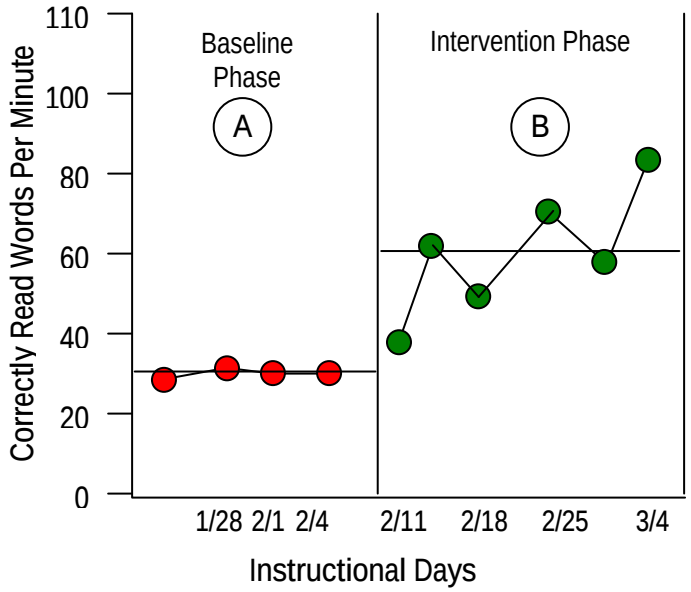
the classroom of the student being monitored. The *aimline* is a sloping line that shows the rate at which the student is predicted to make progress if the intervention is successful. The aimline in Figure 2 shows an expected increase of about 1.5 words per week in reading fluency. By plotting both goal line and aimline on the progress-monitoring chart, the RTI Team can visually compare the student's actual performance on a given day to his or her expected rate of progress (aimline) and eventual goal for improvement (goal line).

Visual interpretation of time-series data

When data points are plotted on a time-series chart, the observer can use techniques of visual analysis to uncover meaningful patterns in the data. Trend, variability, and level of data points can all yield significant clues to help in data interpretation.

- *Trend.* Trend is the slope of increase or decrease visible in charted data. A strong trend in the desired direction during an intervention phase would indicate that the intervention is having the predicted positive impact. The data series in section B of Figure 3 shows a much stronger upward trend than that in section A.

Figure 3: Level, Trend, and Variability of Data



- *Variability.* The amount of variability, or fluctuation, of data in each phase can have an impact on progress monitoring. When data in a series show little variability, RTI Teams may need to collect only a small amount of data to show a clear trend. When there is considerable variability, though, RTI Teams may be required to collect more data to discern the underlying trend. The data series charted in Phase B of Figure 3 shows much more variability than the series in Phase A.

- *Level.* The level of a data series is the average, or mean, of the data within that series. For example, in a data series with four values (45,58, 62, 47) , the level (mean) is 53. The level can be a useful method for summarizing the average for each data phase, particularly when there is a considerable amount of variability in the data. On a time-series chart, the level of a data series is usually plotted as a horizontal line corresponding to the mean of the phase. In Figure 3, the level of Phase B (60 correctly read words per minute) is considerably greater than that of Phase A (34 correctly read words per minute).

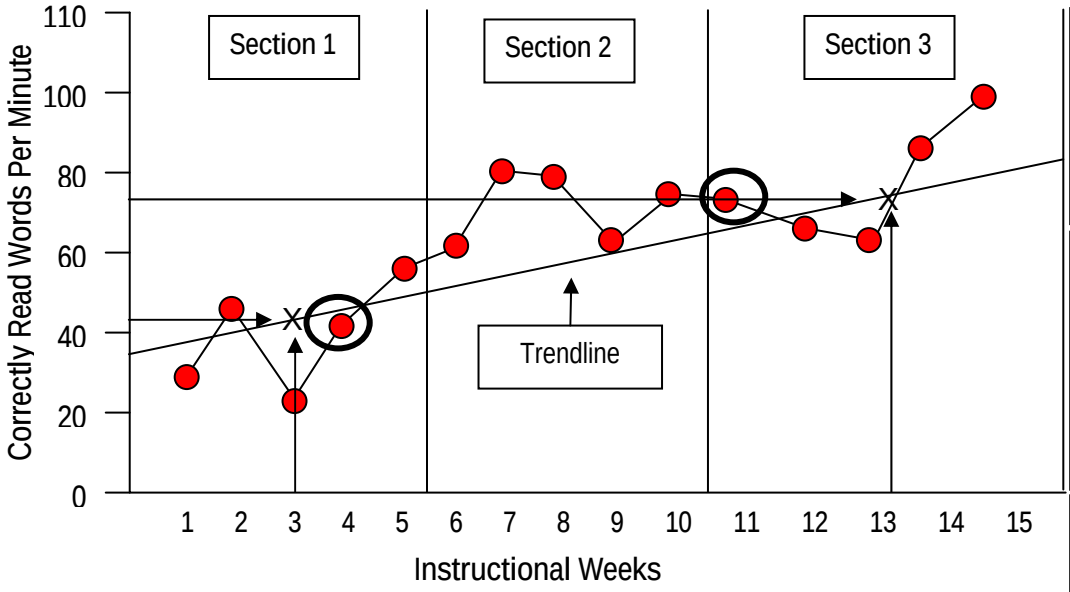
Plotting trendlines to determine the underlying 'trend' of charted data

Data points plotted on a time-series chart often have considerable fluctuation, or variability, making it difficult to 'see' the underlying trend of the data with any precision. Trendlines are straight lines superimposed on charted data to show a simplified 'best estimate' of the student's actual rate of progress. This section presents an easy method for plotting a trendline by hand.

Plotting trendlines with the Tukey method. To plot the trendline using the Tukey method, the observer first counts up the data-points on the graph and draws two vertical lines that divide the data-points evenly into 3 groupings. (If the number of data-points does not exactly divide into 3 parts, the groupings should be approximately equal. For example, if the chart contains 11 data-points, they can be divided into groups of 4, 3, and 4 data-points.)

Next, the observer concentrates on the first and third sections of the graph, ignoring the middle section. In each of the two selected sections, the observer finds the median point on the X (horizontal) and Y (vertical) axes and marks an "X" on the graph at the place where those points intersect. To locate the median time (e.g., instructional week) on the horizontal axis of a section, the observer looks at the span of weeks in which data was collected. For example, if data-points appear for weeks 1- 5 in the first section, the observer considers the middle, or median, point to be week 3.

Figure 5: Plotting a trendline with the Tukey Method



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Step 1: Divide the data series into 3 equal sections by drawing 2 vertical lines. (If the points divide unevenly, group them approximately.)

Step 2: In Section 1 and Section 3, find the median data point and median instructional week. In each section, mark the point on the graph where the two values intersect with an 'X'.

Step 3: Draw a line through the two 'X's', extending to the margins of the graph. This represents the trendline, or line of improvement.

To locate the median number of observed behaviors on the vertical axis, the observer examines the data-points in the graph-section, selecting the median or middle, value from among the range of points. For example, if data-points for weeks 1- 5 in the first section are 30, 49, 23, 41, and 59, the median (middle) value is 41. When the observer has found and marked the point of intersect of median X and Y values in both the first and third sections, a line is then drawn through the two points, extending from the left to the right margins of the graph. By drawing a line through the 2 X's plotted on the graph, the observer creates a trendline that provides a reasonably accurate visual summary of progress.

References

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