



RTI Toolkit: A Practical Guide for Schools

RTI: Academic Interventions for Difficult-to-Teach Students

Jim Wright, Presenter

Ohio School Psychologists Association
Spring Conference 2010
Cleveland, Ohio

Jim Wright
364 Long Road
Tully, NY 13159
Email: jim@jimwrightonline.com
Download workshop resources at: www.interventioncentral.org/OSPA.php

Defining Academic Problems: Do It Right and Interventions Are More Likely to Be Effective

Students who struggle with academic deficits do not do so in isolation. Their difficulties are played out in the larger context of the school environment and curriculum—and represent a ‘mismatch’ between the characteristics of the student and the instructional demands of the classroom (Foorman & Torgesen, 2001). It may surprise educators to learn that the problem-identification step is the most critical for matching the student to an effective intervention (Bergan, 1995). Problem identification statements should be defined in clear and specific terms sufficient to pass ‘the stranger test’ (Howell, Hosp, & Kurns, 2008). That is, the student problem can be judged as adequately defined if a person with no background knowledge of the case and equipped only with a copy of the problem-identification statement can observe the student in the academic setting and know with confidence when the problem behavior is displayed and when it is not.

Here are recommendations for increasing teacher capacity to frame student skills in relation to curriculum requirements, describe student academic problems in specific terms, and place student academic deficits in the context of task demands and peer expectations.

1. **Be knowledgeable of the school academic curriculum and key student academic skills that are taught.** The teacher should have a good survey-level knowledge of the key academic skills outlined in the school’s curriculum—for the grade level of their classroom as well as earlier grade levels. If the curriculum alone is not adequate for describing a student’s academic deficit, the instructor can make use of research-based definitions or complete a task analysis to further define the academic problem area. Here are guidelines for consulting curriculum and research-based definitions and for conducting a task analysis for more global skills:

- *Curriculum.* The teacher can review the school’s curriculum and related documents (e.g., score-and-sequence charts; curriculum maps) to select specific academic skill or performance goals. Of course, if the student is performing well below grade-level, the teacher should be prepared to go ‘off-level’ by reviewing curriculum goals from earlier grades. First, determine the approximate grade or level in the curriculum that matches the student’s skills. Then, review the curriculum at that alternate grade level to find appropriate descriptions of the student’s relevant academic deficit.

For example, a teacher noted that her second-grade student had limited phonemic awareness: the student was not able accurately to deconstruct a spoken word into its component sound-units, or phonemes. In her school’s curriculum, children were expected to attain proficiency in phonemic awareness by the close of grade 1. The teacher went ‘off level’ to review the grade 1 curriculum and found a specific description of phonemic awareness that she could use as a starting point in defining the student’s skill deficit.

- *Research-Based Skill Definitions.* Even when a school’s curriculum identifies key skills, schools may find it useful to corroborate or elaborate those skill definitions by reviewing alternative definitions published in research journals or other trusted sources.

For example, an algebra teacher had a student with delays in solving quadratic equations. The

instructor found that the school's math curriculum did not provide a detailed description of the various skills required to successfully complete quadratic equations. So the teacher reviewed the report issued by the National Mathematics Advisory Panel (Fennell et al., 2008) The teacher discovered in that document a detailed description of the component skills for solving quadratic equations, including "factors and factoring of quadratic polynomials with integer coefficients", "completing the square in quadratic expressions" and "quadratic formula and factoring of general quadratic polynomials". By combining the skill definitions from the school curriculum with the more detailed descriptions taken from the research-based document, the teacher was better able to pinpoint the student's area of academic deficit in specific terms.

- *Task Analysis.* Students sometimes possess deficits in more global 'academic enabling' skills that are not specifically outlined in the curriculum but are nonetheless essential for academic success. In such cases, teachers can complete an analysis of the relevant skill by breaking that more global skill down into a checklist of constituent subskills. This process is known as 'discrete categorization' (Kazdin, 1989) or task analysis. An instructor can use the resulting checklist to verify that the student can or cannot perform each of the subskills that make up the global 'academic enabling' skill.

For example, teachers at a middle school noted that many of their students seemed to have poor 'organization' skills when completing in-class assignments. Yet none of the teachers initially agreed on just how to define the term 'organization'. So those instructors worked together to complete a task analysis and determined that--in their classrooms--the essential subskills of 'student organization' included (a) arriving to class on time; (b) bringing work materials to class; (c) following teacher directions in a timely manner; (d) knowing how to request teacher assistance when needed; and (e) having an uncluttered desk with only essential work materials. The teachers found this task analysis to be useful, as it allowed them to agree on the essential ingredients of 'good organization' and also yielded a useful checklist to verify that students possessed every one of the important subskills that make up the larger skill.

2. Describe the academic problem in specific, skill-based terms (Batsche et al., 2008; Upah, 2008). Write a clear, brief description of the academic skill or performance deficit that focuses on a specific skill or performance area. Here are sample problem-identification statements:
 - John's reads aloud from grade-appropriate text much more slowly than his classmates.
 - Ann lacks proficiency with multiplication math problems (double-digit times double-digit with no regrouping).
 - Tye does not turn in homework assignments.
 - Angela produces limited text on in-class writing assignments.
3. Develop a fuller description of the academic problem to provide a meaningful instructional context. When the teacher has described the student's academic problem, the next step is to expand the problem definition to put it into a meaningful context. This expanded definition includes information about the conditions under which the academic problem is observed and typical or expected level of performance.

- *Conditions.* Describe the environmental conditions or task demands in place when the academic problem is observed.
- *Problem Description.* Describe the actual observable academic behavior in which the student is engaged. Include rate, accuracy, or other quantitative information of student performance.
- *Typical or Expected Level of Performance.* Provide a typical or expected performance criterion for this skill or behavior. Typical or expected academic performance can be calculated using a variety of sources,

Academic Problems: Sample Definitions		
Environmental Conditions or Task Demands	Problem Description	Typical or Expected Level of Performance
When given a passage from the 3 rd grade reading series book...	...John reads 56 words per minutes...	... compared to DIBELS mid-year 3 rd -grade benchmark norms of 78 words per minute.
On a math computation worksheet (double-digit times double-digit with no regrouping)...	...Ann computes 45 digits per minute...	...while peers in her 3 rd grade compute an average of 67 correct digits.
During social studies large-group instruction...	...Franklin attends to instruction an average of 45% of the time...	... while peers in the same room attend to instruction an average of 85% of the time.
For science homework...	... Tye turns in assignments an average of 50% of the time...	... while the classroom median rate of homework turned in is 90%.
On weekly 30-minute in-class writing assignments...	... Angela produces compositions that average 145 words...	...while a sampling of peer compositions shows that the typical student writes an average of 254 words.

4. **Develop a hypothesis statement to explain the academic skill or performance problem.** The hypothesis states the assumed reason(s) or cause(s) for the student's academic problems. Once it has been developed, the hypothesis statement acts as a compass needle, pointing toward interventions that most logically address the student academic problems.

Academic Problems: Possible Hypotheses & Recommendations	
Hypothesis Recommendation	
<input type="checkbox"/> <i>Skill Deficit.</i> The student has not yet acquired the skill.	Provide direct, explicit instruction to acquire the skill. Reinforce the student for effort and accuracy.
<input type="checkbox"/> <i>Fluency Deficit.</i> The student has acquired the basic skill but is not yet proficient.	Provide opportunities for the student to practice the skill and give timely performance feedback. Reinforce the student for fluency as well as accuracy.

<input type="checkbox"/> <i>Generalization Deficit.</i> The student possesses the basic skill but fails to use it across appropriate situations or settings.	Train the student to identify the relevant characteristics of situations or settings when the skill should be used. Provide incentives for the student to use the skill in the appropriate settings.
<input type="checkbox"/> <i>Motivation (Performance) Deficit.</i> The student is capable of performing the skill and can identify when use of the skill is appropriate—but nonetheless fails to use the skill.	Use various strategies to engage the student in the skill (e.g., select high-interest learning activities; offer incentives to the student for successful use of the skill, etc.).
<input type="checkbox"/> <i>Escape or Avoidance.</i> The student behavior is intended to allow them to stop an academic activity (escape) or to prevent them from participating in the activity (avoidance).	Check for appropriate instructional match to ensure that the student experiences sufficient success in the activity. Use motivation strategies (see above) to promote student interest and engagement. Offer the student opportunities for choice in the academic activity.

References

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Teacher/Team: _____ Date: _____ Student: _____

Student Problem Definition #1: _____

Student Problem Definition #2: _____

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

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| <p>Interventions: Essential Elements (Witt et al., 2004)</p> <ul style="list-style-type: none"> • 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.

Intervention Script Builder for: Student Name: _____ Grade: _____

Teacher/Team: _____ Intervention Start Date: ____/____/____

Description of the Target Academic or Behavior Concern: _____

Intervention Check	Intervention Preparation Steps: Describe any preparation (creation or purchase of materials, staff training, etc.) required for this intervention.	Person(s) Responsible
This step took place Y__ N__	1. _____	
This step took place Y__ N__	2. _____	
This step took place Y__ N__	3. _____	

Intervention Check	Intervention Steps: Describe the steps of the intervention. Include enough detail so that the procedures are clear to all who must implement them.	Person(s) Responsible
This step took place Y__ N__	1. _____ _____	
This step took place Y__ N__	2. _____ _____	
This step took place Y__ N__	3. _____ _____	
This step took place Y__ N__	4. _____ _____	
This step took place Y__ N__	5. _____ _____	
This step took place Y__ N__	6. _____ _____	

Research Citation(s) / References: List the published source(s) that make this a 'scientifically based' intervention.

Intervention Quality Check: How will data be collected to verify that this intervention is put into practice as it was designed? (Select at least one option.)

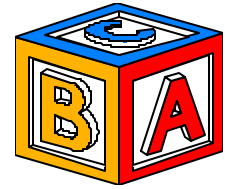
- Classroom Observation: Number of observations planned? _____
Person responsible for observations?: _____
- Teacher Intervention Rating Log: How frequently will the teacher rate intervention follow-through?
Daily ___ Weekly ___
- Teacher Verbal Report: Who will check in with the teacher for a verbal report of how the intervention is progressing? _____
Approximately when during the intervention period will this verbal 'check in' occur? _____
- Rating Intervention Follow-Through: Select either the classroom teacher/team or an outside observer to rate the quality of the intervention and check the appropriate set of directions below.

___ *Teacher Directions*: Make copies of this intervention script. Once per week, review the steps in the intervention script and note (Y/N) whether each step was *typically* followed. Then write any additional notes about the intervention in the blank below

___ *Independent Observer Directions*: Make copies of this intervention script. At several points during the intervention, make an appointment to observe the intervention in action. While observing the intervention, go through the steps in the intervention script and note (Y/N) whether each step was typically followed. Then write any additional notes about the intervention in the space below

Intervention Observation Notes: _____

Building Blocks of Effective Instruction



Good classroom instruction is no accident. Two powerful tools for analyzing the quality of student instruction are the *Instructional Hierarchy* and the *Learn Unit*.

Instructional Hierarchy. As students are taught new academic skills, they go through a series of predictable learning stages. At the start, a student is usually halting and uncertain as he or she tries to use the target skill. With teacher feedback and lots of practice, the student becomes more fluent, accurate, and confident in using the skill. It can be very useful to think of these phases of learning as a *hierarchy* (See chart on page 2). The learning hierarchy (Haring, Lovitt, Eaton, & Hansen, 1978) has four stages: *acquisition*, *fluency*, *generalization*, and *adaptation*:

1. **Acquisition.** The student has begun to learn how to complete the target skill correctly but is not yet accurate or fluent in the skill. The goal in this phase is to improve accuracy.
2. **Fluency.** The student is able to complete the target skill accurately but works slowly. The goal of this phase is to increase the student's speed of responding (fluency).
3. **Generalization.** The student is accurate and fluent in using the target skill but does not typically use it in different situations or settings. Or the student may confuse the target skill with 'similar' skills. The goal of this phase is to get the student to use the skill in the widest possible range of settings and situations, or to accurately discriminate between the target skill and 'similar' skills.
4. **Adaptation.** The student is accurate and fluent in using the skill. He or she also uses the skill in many situations or settings. However, the student is not yet able to modify or adapt the skill to fit novel task demands or situations.

The 'Learn Unit'. At the core of good instruction lies the "Learn Unit", a 3step process in which the student is invited to engage in an academic task, delivers a response, and then receives immediate feedback about how he or she did on the task (Heward, 1996). Here is an explanation of the stages of the 'Learn Unit':

1. **Academic Opportunity to Respond.** The student is presented with a meaningful opportunity to respond to an academic task. A question posed by the teacher, a math word problem, and a spelling item on an educational computer 'Word Gobbler' game could all be considered academic opportunities to respond.
2. **Active Student Response.** The student answers the item, solves the problem presented, or completes the academic task. Answering the teacher's question, computing the answer to a math word problem (and showing all work), and typing in the correct spelling of an item when playing an educational computer game are all examples of active student responding.
3. **Performance Feedback.** The student receives timely feedback about whether his or her response is correct—often with praise and encouragement. A teacher exclaiming "Right! Good job!" when a student gives an response in class, a student using an answer key to check her answer to a math word problem, and a computer message that says "Congratulations! You get 2 points for correctly spelling this word!" are all examples of corrective feedback.

The more frequently a student cycles through complete 'Learn Unit' trials, the faster that student is likely to make learning progress. If any one of these steps is missing, the quality of instruction will probably be compromised.

References

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Instructional Hierarchy: Matching Interventions to Student Learning Stage (Haring, et al., 1978)

Learning Stage	Student 'Look-Fors'...	What strategies are effective...
<p>Acquisition: Exit Goal: The student can perform the skill accurately with little adult support.</p>	<ul style="list-style-type: none"> • Is just beginning to learn skill • Not yet able to perform learning task reliably or with high level of accuracy 	<ul style="list-style-type: none"> • Teacher actively demonstrates target skill • Teacher uses 'think-aloud' strategy-- especially for thinking skills that are otherwise covert • Student has models of correct performance to consult as needed (e.g., correctly completed math problems on board) • Student gets feedback about correct performance • Student receives praise, encouragement for <i>effort</i>
<p>Fluency: Exit Goals: The student (a) has learned skill well enough to retain (b) has learned skill well enough to combine with other skills, (c) is as fluent as peers.</p>	<ul style="list-style-type: none"> • Gives accurate responses to learning task • Performs learning task slowly, haltingly 	<ul style="list-style-type: none"> • Teacher structures learning activities to give student opportunity for active (observable) responding • Student has frequent opportunities to <i>drill</i> (direct repetition of target skill) and <i>practice</i> (blending target skill with other skills to solve problems) • Student gets feedback on <i>fluency</i> and <i>accuracy</i> of performance • Student receives praise, encouragement for <i>increased fluency</i>
<p>Generalization: Exit Goals: The student (a) uses the skill across settings, situations; (b) does not confuse target skill with similar skills</p>	<ul style="list-style-type: none"> • Is accurate and fluent in responding • May fail to apply skill to new situations, settings • May confuse target skill with similar skills (e.g., confusing '+' and 'x' number operation signs) 	<ul style="list-style-type: none"> • Teacher structures academic tasks to require that the student use the target skill regularly in assignments. • Student receives encouragement, praise, reinforcers for using skill in new settings, situations • If student confuses target skill with similar skill(s), the student is given practice items that force him/her to correctly discriminate between similar skills • Teacher works with parents to identify tasks that the student can do outside of school to practice target skill • Student gets periodic opportunities to review, practice target skill to ensure maintenance
<p>Adaptation: Exit Goal: The Adaptation phase is continuous and has no exit criteria.</p>	<ul style="list-style-type: none"> • Is fluent and accurate in skill • Applies skill in novel situations, settings without prompting • Does not yet modify skill as needed to fit new situations (e.g., child says 'Thank you' in all situations, does not use modified, equivalent phrases such as "I appreciate your help.") 	<ul style="list-style-type: none"> • Teacher helps student to articulate the <i>'big ideas'</i> or core element(s) of target skill that the student can modify to face novel tasks, situations (e.g., fractions, ratios, and percentages link to the 'big idea' of <i>the part in relation to the whole</i>; 'Thank you' is part of a larger class of <i>polite speech</i>) • Train for adaptation: Student gets opportunities to practice the target skill with modest modifications in new situations, settings with encouragement, corrective feedback, praise, other reinforcers. • Encourage student to set own goals for adapting skill to new and challenging situations.

Academic Intervention Checklist

Directions: The checklist below describes key points about academic interventions.

<p>Interventions & Related Concepts: Definitions</p>
<p>Core Instruction. Those instructional strategies that are used routinely with all students in a general-education setting are considered ‘core instruction’. High-quality instruction is essential and forms the foundation of RTI academic support. NOTE: While it is important to verify that good core instructional practices are in place for a struggling student, those routine practices do not ‘count’ as individual student interventions.</p> <p>Intervention. An academic <i>intervention</i> is a strategy used to teach a new skill, build fluency in a skill, or encourage a child to apply an existing skill to new situations or settings. An intervention can be thought of as “a set of actions that, when taken, have demonstrated ability to change a fixed educational trajectory” (Methe & Riley-Tillman, 2008; p. 37).</p> <p>Accommodation. An accommodation is intended to help the student to fully access and participate in the general-education curriculum without changing the instructional content and without reducing the student’s rate of learning (Skinner, Pappas & Davis, 2005). An accommodation is intended to remove barriers to learning while still expecting that students will master the same instructional content as their typical peers. An accommodation for students who are slow readers, for example, may include having them supplement their silent reading of a novel by listening to the book on tape. An accommodation for unmotivated students may include breaking larger assignments into smaller ‘chunks’ and providing students with performance feedback and praise for each completed ‘chunk’ of assigned work (Skinner, Pappas & Davis, 2005).</p> <p>Modification. A modification changes the expectations of what a student is expected to know or do—typically by lowering the academic standards against which the student is to be evaluated. Examples of modifications are giving a student five math computation problems for practice instead of the 20 problems assigned to the rest of the class, letting the student consult course notes during a test when peers are not permitted to do so, and allowing a student to select a much easier book for a book report than would be allowed to his or her classmates.</p> <p>Instructional modifications are essential elements on the Individualized Education Plans (IEPs) or Section 504 Plans of many students with special needs. Modifications are generally not included on a general-education student’s RTI intervention plan, because the working assumption is that the student can be successful in the curriculum with appropriate interventions and accommodations alone.</p>
<p>Tiers of Intervention</p>
<p>Tier 1 instruction/interventions: Universal. The Tier 1 level of instruction / academic intervention is universal—available to all students. It is comprehensive and forms the foundation of student learning. Tier 1 instruction includes all of the elements that make up ‘core instruction’. (a) the curriculum, (b) all published or teacher-made materials used to deliver that curriculum, and (c) teacher use of ‘whole-group’ teaching and classroom management strategies to promote optimal learning. Tier 1 intervention includes the teacher’s use of specific intervention strategies with specific students who display academic delays or other learning-related problems. NOTE: RTI interventions are additive. It is expected that any student on Tier 2 or 3 intervention (described below) will simultaneously be receiving individualized Tier 1 support in the classroom</p>

Whether instruction or intervention, strategies at Tier 1 are evidence-based ‘good teaching’ ideas that teachers can use independently with groups or individual students without needing to initiate an RTI referral. The minimum expectation is that at least 80% of students will be successful in any targeted area (e.g., reading comprehension, math computation) with Tier 1 (classroom) supports alone (Christ, 2008). The school tracks the progress of all students at Tier 1 by conducting universal screenings three times per school year. In these screenings, the school uses Curriculum-Based Measures or similar assessments that evaluate students’ accuracy and fluency in basic academic skills.

Tier 2 interventions: Strategic. Tier 2 interventions are provided to students who have failed to respond adequately to classroom (Tier 1) instruction and interventions. About 15% of students in the typical school may require Tier 2/supplemental intervention support (Burns & Gibbons, 2008). Tier 2 interventions are provided 3 to 5 days per week for at least 30 minutes (Burns & Gibbons, 2008).

- *Small-group.* Tier 2 interventions are frequently provided via small groups, especially in elementary schools. Group academic interventions are more economical to provide than one-to-one instruction. To ensure that Tier 2 interventions are maximally effective, however, (a) group size should not exceed 7 students and (b) students should have a shared profile of intervention need(s). Tier 2 interventions can be delivered through small-group or computer-assisted instruction.
- *Computer-assisted instruction.* Especially in middle and high schools, Tier 2 services may be provided through computer-assisted instruction.

Whether the Tier 2 intervention is delivered by means of small groups or computer, the academic progress of participating students is monitored at least 1-2 times per month.

Tier 3 interventions: Intensive. Tier 3 interventions are the most intensive offered in a general-education setting. Students who have not responded to lesser levels of RTI support qualify for Tier 3 interventions. Tier 3 intervention plans are highly customized to meet the needs of the non-responding student. Tier 3 interventions are provided daily for sessions of 30 minutes. The student-teacher ratio is flexible but should allow students to receive intensive, individualized instruction appropriately matched to their academic deficit(s). Approximately 5% of students in a school might typically be on Tier 3 intervention at any one time.

Because of the intensity of Tier 3 interventions, it is strongly recommended that the school’s RTI Problem-Solving Team take responsibility for assisting teachers to assemble, implement, and track the impact of those plans.

Students who are unsuccessful in Tier 3 intervention plans often face the possibility of ‘high-stakes’ negative outcomes such as course failure or referral for a special education disability. For that reason, academic progress of students in Tier 3 interventions is monitored at least weekly.

Interventions: Avoiding ‘Fatal Flaws’

At any Tier, an academic intervention is more than just an isolated strategy. Any intervention must include 4 essential elements. The absence of any one of the elements would be considered a ‘fatal flaw’ (Witt, VanDerHeyden & Gilbertson, 2004) that blocks the school from drawing meaningful conclusions from the student’s response to the intervention:

1. *Clearly defined problem.* The student’s target concern is stated in specific, observable, measureable terms. This ‘problem identification statement’ is the most important step of the problem-solving model (Bergan, 1995), as a clearly defined problem allows the teacher or RTI

- Team to select a well-matched intervention to address it.
2. *Baseline data.* The teacher or RTI Team measures the student's academic skills in the target concern (e.g., reading fluency, math computation) prior to beginning the intervention. Baseline data becomes the point of comparison throughout the intervention to help the school to determine whether that intervention is effective.
 3. *Performance goal.* The teacher or RTI Team sets a specific, data-based goal for student improvement during the intervention and a checkpoint date by which the goal should be attained.
 4. *Progress-monitoring plan.* The teacher or RTI Team collects student data regularly to determine whether the student is on-track to reach the performance goal.

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Tier 1 (Classroom) Interventions: Building Your School's Capacity

Directions: Schools must plan carefully to build their capacity to carry out evidence-based Tier 1 interventions in the classroom. Below is an 8-point checklist that schools can follow to expand their capacity to provide appropriate teacher-led classroom interventions available to all students who might need them.

- Train Teachers to Write Specific, Measureable, Observable 'Problem Identification Statements'.
- Inventory Tier 1 Interventions Already in Use.
- Create a Standard Menu of Evidence-Based Tier 1 Intervention Ideas for Teachers.
- Establish Tier 1 Coaching and Support Resources.
- Provide Classroom (Tier 1) Problem-Solving Support to Teachers.
- Set Up a System to Locate Additional Evidence-Based Tier 1 Intervention Ideas.
- Create Formal Guidelines for Teachers to Document Tier 1 Strategies.
- Develop Decision Rules for Referring Students from Tier 1 to Higher Levels of Intervention.

<input type="checkbox"/> Train Teachers to Write Specific, Measureable, Observable 'Problem Identification Statements'. Teachers are able to describe common student academic and behavioral problems accurately in specific, observable, measurable terms.

If training in this skill is required, how will teachers receive this training? _____ _____ _____

If training is required, who will provide the training? _____

Tip: Review past student cases referred to your school's RTI Team (Problem-Solving Team). For each case, list the primary reason(s) that the student was referred. Review this cumulative list of referral concerns to determine (a) the kinds of student referral concerns that teachers are most likely to encounter and (b) whether referring teachers are able to articulate clearly and specifically their concerns about students.

<input type="checkbox"/> Inventory Tier 1 Interventions Already in Use. The school surveys teachers' current classroom intervention practices to discover those effective strategies that they are already using. This information can assist the school in understanding the staff's present capacity to deliver classroom interventions, as well as gaps in intervention knowledge and use.

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| <ol style="list-style-type: none"> 1. Generate a list of 4-6 TOP teacher RTI referral concerns for your school (e.g., 'lack of study/organizational skills', 'limited content-area vocabulary'). 2. Create a survey form for teachers that lists each top RTI referral concern and asks that |
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teachers write down those whole-group or individual student strategies that they routinely use in the classroom to address that concern. Teachers are encouraged to write enough detail so that the strategy is clear to others. (Note: As a sample survey, review the form *Teacher Survey: What Classroom (Tier 1) Instruction/Intervention Strategies Do You Currently Use?* later in this packet.)

3. Review the surveys. Compile a list of the best teacher strategies—organized by referral concern. Include only those classroom intervention ideas that are supported by research.
4. Analyze the results on the classroom intervention survey to determine current teacher intervention practices; variability of intervention use among classrooms, grade levels, teams, or departments; intervention areas in which teachers require additional training, etc.

Tips:

- Your school can identify potential ‘intervention coaches’ among your staff by reviewing teacher responses to the intervention surveys. Contact those teachers who list innovative and effective intervention ideas and ask whether they might be willing to serve as informal ‘intervention coaches’, being available to demonstrate those strategies to other teachers and coach those teachers in their use.
- Once your school has created a list of the ‘best’ classroom intervention ideas organized by referral concern, give a copy of that list to teachers. Point out that staff already routinely provides Tier 1 interventions to students—and that over time the RTI model will simply build on this existing capacity.
- Scan the teacher Tier 1 intervention survey results. Select the strongest entries to add to the schoolwide Tier 1 intervention menu (see next section).

Create a Standard Menu of Evidence-Based Tier 1 Intervention Ideas for Teachers. When given a menu of evidence-based classroom interventions, teachers can independently access and use them to address common student academic and behavioral concerns.

1. Generate a list of the academic and behavioral concerns for which your teachers appear most in need of classroom intervention strategies (e.g., ‘reading fluency’, ‘inattention in class’). (Note: To record these areas of student concern, you can use the form *Grade- or Building-Wide Student Academic / Behavioral Concerns for Which Tier 1 Intervention Menus Will Be Developed* that appears later in this packet.)
2. For each common student concern, locate evidence-based intervention ideas from research journals and other print publications, websites, etc.
3. Write each intervention idea in a teacher-friendly format, including sufficient detail for the instructor to implement the strategy in the classroom. Organize all of the collected ideas into a Tier 1 intervention menu. Group each intervention under the appropriate category of teacher concern (e.g., ‘reading fluency’, ‘inattention in class’). Share these intervention menus with teachers.

Tip: The What Works Clearinghouse has an expanding series of ‘practice guides’ with empirically supported classroom ideas for instruction and behavior management. These guides are one good source for Tier 1 intervention ideas. You can review these practice guides at: <http://ies.ed.gov/ncee/wwc/publications/practiceguides/>

Establish Tier 1 Coaching and Support Resources. Teachers are encouraged to access colleagues as needed who can demonstrate how to use effective Tier 1 interventions—and can

also provide coaching and feedback in those intervention skills.

1. Identify personnel in your school (and perhaps district-wide) who can be available to meet with teachers as intervention coaches.
2. Train these personnel to be effective Tier 1 coaches by ensuring that they follow a structured sequence in their coaching: a. meet with the teacher to select one or more ideas from the school's Tier 1 intervention menu, b. show the teacher how to use each selected strategy, c. go into the teacher's class if needed to demonstrate the strategy, d. observe the teacher use the strategy and give performance feedback.
3. Compile a list of people in the school who can serve as intervention coaches. Share that list with teachers. Include information about how teachers can contact coaches and how to schedule coaching sessions.

Tip: Find creative ways to make Tier 1 intervention coaching time-efficient. If your school has grade-level / teaching team / department meetings, for example, consider bringing coaches to those meetings occasionally to show all teachers how to use interventions for shared concerns.

Provide Classroom (Tier 1) Problem-Solving Support to Teachers. Teachers can reach out to colleagues for additional Tier 1 classroom intervention ideas that they can try before referring a student to higher levels of intervention.

OPTION A: Time is regularly reserved at grade-level / teaching team / department meetings for teachers to bring students up for discussion. The team and teacher generate a list of evidence-based interventions that the teacher can implement.

How frequently will this team meet to discuss students struggling at Tier 1? _____

How will those intervention ideas be documented? _____

OPTION B: The school generates a list of building-level (and perhaps district-level) personnel who can serve as Tier 1 intervention consultants, meeting individually with teachers to brainstorm classroom intervention ideas.

How will this consultant list be developed and shared with teachers? _____

How will those intervention ideas be documented? _____

Who are candidates to serve as Tier 1 consultants? (Use attached *Tier 1 (Classroom) Intervention Consultant List*).

Tips:

- Invite personnel with specialized training (e.g., reading teachers) to attend grade-level / teaching team / department Tier 1 intervention planning meetings when appropriate to generate additional intervention ideas.
- When selecting candidates for a consultant list, prepare a simple anonymous teacher survey.

On that survey, list the most common academic and behavioral concerns that lead to RTI student referrals in your school. Next to each concern, ask teachers to write in the names of building (and perhaps district) personnel whom they would seek out for intervention ideas. Recruit those people for your consultant list whose names appear most frequently on completed teacher surveys.

Set Up a System to Locate Additional Evidence-Based Tier 1 Intervention Ideas. As research identifies additional effective classroom strategies, the school is able routinely to learn of those strategies and add them to its Tier 1 intervention menu.

1. Appoint staff members to serve as 'knowledge brokers' who monitor different intervention topic areas (e.g., inattention in class, study skills, reading fluency, etc.).
2. These knowledge brokers read research journals, attend workshops and otherwise stay current on emerging research into school intervention in their topic area(s).
3. Knowledge brokers periodically make recommendations to the school on innovative intervention ideas that should be added to the Tier 1 intervention menu.

Tip: Consider appointing at least two school staff members to serve as knowledge brokers for each intervention topic area. Sharing responsibilities for staying current on intervention research allows knowledge brokers to collaborate and pool their knowledge—thus making the task more manageable.

Create Formal Guidelines for Teachers to Document Tier 1 Strategies. Teachers have a single format for documenting their Tier 1 strategies for students who may be referred for higher levels of intervention.

Create one form that all teachers use to document their classroom interventions in a uniform manner. (See attached Tier 1 Intervention Planner form as a sample documentation format.)

Tip: Be sure that teachers use the standard classroom intervention documentation form at the point when they seek out additional Tier 1 intervention ideas from their fellow teachers or school consultants. Intervention documentation is much easier to do at the point that an intervention is first planned than after that intervention has already been implemented.

Develop Decision Rules for Referring Students from Tier 1 to Higher Levels of Intervention. Teachers know when they have attempted a sufficient number of classroom strategies for a still-struggling student and should refer the student for more intervention support.

Establish general decision rules to guide teachers in determining whether they have put sufficient effort into classroom interventions before seeking additional intervention support. These rules should include:

- The minimum number of evidence-based classroom interventions that the teacher should implement and document.
- The minimum period of time that classroom interventions should typically be implemented before teachers should consider a higher level of RTI intervention.
- The expected documentation that teachers should complete describing their Tier 1/classroom intervention efforts.

Tip: Include teachers in the development of decision rules for Tier 1 interventions. When presenting those decision rules to school faculty, be sure to emphasize that the decision rules are simply a formal structured version of good instruction and behavior management.

Teacher Survey: What Classroom (Tier 1) Instruction/Intervention Strategies Do You Currently Use?

Name: _____ Date: _____

Directions. For the academic or behavioral concern below, write down those whole-group or individual student strategies that you routinely use in the classroom to address that concern. Please write enough detail so that your strategy is clear to those reviewing this survey.

If we share any of your intervention ideas with staff, may we cite you as the source? __Y __N

Academic or Behavioral Concern: _____

	Teacher Strategy
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Paired Reading

Description: The student reads aloud in tandem with an accomplished reader. At a student signal, the helping reader stops reading, while the student continues on. When the student commits a reading error, the helping reader resumes reading in tandem.

Materials:

- Reading book

Preparation:

- The teacher, parent, adult tutor, or peer tutor working with the student should be trained in advance to use the paired-reading approach.



Intervention Script:

1. Sit with the student in a quiet location without too many distractions. Position the book selected for the reading session so that both you and the student can easily follow the text.
2. Say to the student, *“Now we are going to read aloud together for a little while. Whenever you want to read alone, just tap the back of my hand like this [demonstrate] and I will stop reading. If you come to a word you don’t know, I will tell you the word and begin reading with you again.”*
3. Begin reading aloud with the student. If the student misreads a word, point to the word and pronounce it. Then have the student repeat the word. When the student reads the word correctly, resume reading through the passage.
4. When the child delivers the appropriate signal (a hand tap), stop reading aloud and instead follow along silently as the student continues with oral reading. Be sure occasionally to praise the student in specific terms for good reading (e.g., “That was a hard word. You did a nice job sounding it out!”).
5. If, while reading alone, the child either commits a reading error or hesitates for longer than 5 seconds, point to the error-word and pronounce it. Then tell the student to say the word. When the student pronounces the error-word correctly, begin reading aloud again in unison with the student.
6. Continue reading aloud with the student until he or she again signals to read alone.

Tips:

Paired reading is a highly structured but simple strategy that can easily be taught to others—including to school-age children and youth. If you have a pool of responsible older

students available you may want to create a cross-age peer tutoring program that uses paired reading as its central intervention. Or train parents to use this simple reading strategy when they read with their children at home.

References:

Topping, K. (1987). Paired reading: A powerful technique for parent use. *Reading Teacher, 40*, 608-614.

Reading Comprehension: Question-Generation

Description: Students are taught to boost their comprehension of expository passages by (1) locating the main idea or key ideas in the passage and (2) generating questions based on that information.

Reserve at least a full instructional session to introduce this comprehension strategy. (For effective-teaching tips, consult the guidelines presented in *“Introducing Academic Strategies to Students: A Direct-Instruction Approach”*).

Materials:

- Overhead transparencies of practice reading passages, transparency markers
- Student copies of practice reading passages (optional) or reading/text books

Preparation:

- Prepare overheads of sample passages.

Intervention Script:

1. Introduce this strategy to the class:

- A. **Locating Explicit Main Idea:** Tell students that some passages have summary sentences that state the main idea or “gist” of the paragraph or passage. Using examples of passages with explicit main ideas, train students to identify and underline main-idea sentences.
- B. **Finding Key Facts.** In some passages, the main idea is implied rather than explicitly stated. Readers must first identify the key facts or ideas of the passage before they can summarize the passage’s main idea.

Using examples of passages with implied main ideas, locate and circle key facts or ideas. Describe to students how you distinguished this central information from less important details. Have students practice this skill on additional practice passages.

- C. **Writing a “Gist” Sentence.** Show students a passage with an implied main idea. Circle all key ideas or facts. Demonstrate how to write a “gist” sentence (one that is built from the identified key ideas and summarizes the paragraph’s main idea). Emphasize that the reader may have link information from different sections of the passage to build a gist sentence. Have students practice this skill on additional practice passages.
- D. **Generating Questions.** Tell students that careful readers often construct questions about what they are reading to help them learn. Put up a list of ‘signal words’ that can be used as question-starters: e.g., who, what, where, when, why, how. Using sample passages, show students how to convert

explicit main-idea sentences or reader-created “gist” sentences into questions. Point out that these questions can be a good study tool because they are linked to answers that the student has already located in the passage.

2. Give students selected practice passages and instruct them to apply the full question-generation strategy. Provide feedback and encouragement as needed.

Tips:

Use “Gist” Sentences to Organize Student Research Notes. When students are writing research papers, they often find it challenging to synthesize their scattered research notes into an orderly outline with sequentially presented main ideas. Students who have mastered the skill of assembling key ideas into “gist” sentences can identify their most important research notes, copy these notes individually onto index cards, and group cards with related notes. The student can then write a single “gist” sentence for each pile of note cards and use these sentences as the starting point for a paper outline.

Collect Exemplary Examples of Student-Generated Questions as Study Aids. If your class is using an assigned textbook, you may want to collect well-written student-generated questions and share them with other students. Or assign students different sections of an article or book chapter and require that they ‘teach’ the content by presenting their text-generated questions and sharing the correct answers.

Select Student Questions As Quiz or Test Items. You can build classroom interest (and competition!) in using this question-generation strategy by occasionally using one or more student text-questions as quiz or test items.

References:

Davey, B., & McBride, S. (1986). Effects of question-generation training on reading comprehension. *Journal of Educational Psychology*, 78, 256-262.

Rosenshine, B., Meister, C., & Chapman, S. (1996). Teaching students to generate questions: A review of the intervention studies. *Review of Educational Research*, 66, 181-221.

School-Wide Strategies for Managing...

READING

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The ability to read allows individuals access to the full range of a culture's artistic and scientific knowledge. Reading is a complex act. Good readers are able fluently to decode the words on a page, to organize and recall important facts in a text, to distill from a reading the author's opinions and attitudes, and to relate the content of an individual text to a web of other texts previously read. The foundation that reading rests upon is the ability to decode. Emergent readers require the support of more accomplished readers to teach them basic vocabulary, demonstrate word attack strategies, model fluent reading, and provide corrective feedback and encouragement. Newly established readers must build fluency and be pushed to exercise their reading skills across the widest possible range of settings and situations. As the act of decoding becomes more effortless and automatic, the developing reader is able to devote a greater portion of cognitive energy to understanding the meaning of the text. Reading comprehension is not a single skill but consists of a cluster of competencies that range from elementary strategies for identifying and recalling factual content to highly sophisticated techniques for inferring an author's opinions and attitudes. As researcher Michael Pressley points out, reading comprehension skills can be thought of as unfolding along a timeline. Before beginning to read a particular selection, the skilled student reader must engage prior knowledge, predict what the author will say about the topic, and set specific reading goals. While reading, the good reader self-monitors his or her understanding of the text, rereads sentences and longer passages that are unclear, and updates predictions about the text based on what he or she has just read. After completing a text, the good reader summarizes its main points (perhaps writing them down), looks back in the text to clarify any points that are unclear, and continues to think about the text and its implications for a period of time. Reading comprehension can also be thought of as a bundle of interdependent skills that range from basic to more advanced. Teachers should ensure that students understand and appropriately use simple comprehension strategies (such as looking back in a text to clarify factual information) before teaching them advanced comprehension strategies such as SQ3R ('Survey, Question, Read, Recite, Review'). Ultimately, reading is a competency that is continually honed and improved over a lifetime. The teacher's goal is to build students into independent readers whose skills improve with self-guided practice. Below are a number of instructional strategies to promote word decoding, reading decoding, and reading comprehension.

Independent Practice: Set Up Reading Centers (*Florida Center for Reading Research, 2005*). When students have mastered a reading skill, they can work independently at reading centers to practice and become more fluent in that skill under the watchful eye of the teacher. The reading center is set up with fun and engaging activities designed to extend and reinforce literacy content presented by the teacher. Students work on independent reading-related activities individually or in pairs or groups. As examples of reading center choices, students may listen to taped books, read alone or to each other, use magnetic letters to spell a specified list of words, or create storyboards or comic strips that incorporate pictures and words. Each reading center activity is tied to specific student literacy goals. The activities in reading centers may change often to give children a chance to practice new skills and to keep the content of these centers fresh and engaging.

Reading Comprehension: Activating Prior Knowledge (*Hansen, & Pearson, 1983*). The instructor demonstrates to students how they can access their prior knowledge about a topic to improve comprehension of an article or story. The instructor first explains the benefit of using prior knowledge. The instructor tells students that recalling their prior experiences ("their own life") can help them to understand the content of their reading--because new facts make sense only when we connect them to what we already know. Next, the instructor demonstrates the text prediction strategy to the class by selecting a sample passage (displayed as an overhead) and using a "think-aloud" approach to illustrate the strategy steps: STEP 1: THINK ABOUT WHAT AND WHY:

The teacher connects the article to be read with the instructor's own prior knowledge about the topic. The teacher might say, for example, "I am about to read a short article about [topic]. Before I read the article, though, I should think about my life experiences and what they might tell me about [topic]. By thinking about my own life, I will better understand the article." STEP 2: SELECT MAIN IDEAS FROM THE ARTICLE TO POSE PRIOR-KNOWLEDGE AND PREDICTION QUESTIONS. The teacher chooses up to 3 main ideas that appear in the article or story. For each key idea, the instructor poses one question requiring that readers tap their own prior knowledge of the idea (e.g., "What are your own attitudes and experiences about [idea]?") and another that prompts them to predict how the article or story might deal with the idea (e.g., "What do you think the article will say about [idea]?"). STEP 3: HAVE STUDENTS READ THE ARTICLE INDEPENDENTLY. Once the teacher has primed students' prior knowledge by having them respond to the series of prior-knowledge and prediction questions, students read the selection independently.

Reading Comprehension: Anticipation Reading Guide (*Duffelmeyer, 1994; Merkley, 1996*). To activate their prior knowledge of a topic, students complete a brief questionnaire on which they must express agreement or disagreement with 'opinion' questions tied to the selection to be read; students then engage in a class discussion of their responses. The instructor first constructs the questionnaire. Each item on the questionnaire is linked to the content of the article or story that the students will read. All questionnaire items use a 'forced-choice' format in which the student must simply agree or disagree with the item. After students have completed the questionnaire, the teacher reviews responses with the class, allowing students an opportunity to explain their rationale for their answers. Then students read the article or story.

Reading Comprehension: Building Comprehension of Textbook Readings Through SQ3R (*Robinson, 1946*). Students grasp a greater amount of content from their textbook readings when they use the highly structured SQ3R ('Survey, Question, Read, Recite, Review') process. (1) SURVEY: Prior to reading a section of the textbook, the reader surveys the selection by examining charts, tables, or pictures, looking over chapter headings and subheadings, and reading any individual words or blocks of text highlighted by the publisher. (2) QUESTION: In preparation for reading, the reader next generates and writes down a series of key 'questions' about the content based on the material that he or she has surveyed. (3) READ: As the reader reads through the selection, he or she seeks answers to the questions posed. (4) RECITE: After finishing the selection, the reader attempts to recite from memory the answers to the questions posed. If stuck on a question, the reader scans the text to find the answer. (5) REVIEW: At the end of a study session, the reader reviews the list of key questions and again recites the answers. If the reader is unable to recall an answer, he or she goes back to the text to find it.

Reading Comprehension: Conversing With the Writer Through Text Annotation (*Harris, 1990; Sarkisian, Toscano, Tomkins-Tinch, & Casey, 2003*). Students are likely to increase their retention of information when they interact actively with their reading by jotting comments in the margin of the text. Students are taught to engage in an ongoing 'conversation' with the writer by recording a running series of brief comments in the margins of the text. Students may write annotations to record their opinions of points raised by the writer, questions triggered by the reading, or vocabulary words that the reader does not know and must look up. NOTE: Because this strategy requires that students write in the margins of a book or periodical, text annotation is suitable for courses in which students have either purchased the textbook or have photocopies of the reading available on which to write.

Reading Comprehension: Mining Information from the Text Book (*Garner, Hare, Alexander, Haynes, & Vinograd, 1984*). With 'text lookback' the student increases recall of information by skimming previously read material in the text in a structured manner to look that information up. First, define for the student the difference between 'lookback' and 'think' questions. 'Lookback' questions are those that tell us that the answer can be found right in the article, while 'think' questions are those that ask you to give your own opinion, belief, or ideas. When faced with a lookback question,

readers may need to look back in the article to find the information that they need. But readers can save time by first skimming the article to get to the general section where the answer to the question is probably located. To skim efficiently, the student should (1) read the text-lookback question carefully and highlight the section that tells the reader what to look for (e.g., "What does the article say are the FIVE MOST ENDANGERED SPECIES of whales today?"), (2) look for titles, headings, or illustrations in the article that might tell the reader where the information that he or she is looking for is probably located, (3) read the beginning and end sentences in individual paragraphs to see if that paragraph might contain the desired information.

Reading Comprehension: Previewing the Chapter (Gleason, Archer, & Colvin, 2002). The student who systematically previews the contents of a chapter before reading it increases comprehension--by creating a mental map of its contents, activating prior knowledge about the topic, and actively forming predictions about what he or she is about to read. In the previewing technique, the student browses the chapter headings and subheadings. The reader also studies any important graphics and looks over review questions at the conclusion of the chapter. Only then does the student begin reading the selection.

Reading Comprehension: Question-Answer Relationships (QAR) (Raphael, 1982; Raphael, 1986). Students are taught to identify 'question-answer relationships', matching the appropriate strategy to comprehension questions based on whether a question is based on fact, requires inferential thinking, or draws upon the reader's own experience. Students learn that answers to RIGHT THERE questions are fact-based and can be found in a single sentence, often accompanied by 'clue' words that also appear in the question. Students are informed that they will also find answers to THINK AND SEARCH questions in the text--but must piece those answers together by scanning the text and making connections between different pieces of factual information. AUTHOR AND YOU questions require that students take information or opinions that appear in the text and combine them with the reader's own experiences or opinions to formulate an answer. ON MY OWN questions are based on the students' own experiences and do not require knowledge of the text to answer. Students are taught to identify question-answer relationships in class discussion and demonstration. They are then given specific questions and directed to identify the question type and to use the appropriate strategy to answer.

Reading Comprehension: Reading Actively (Gleason, Archer, & Colvin, 2002). By reading, recalling, and reviewing the contents of every paragraph, the student improves comprehension of the longer passage. The instructor teaches students to first read through the paragraph, paying particular attention to the topic and important details and facts. The instructor then directs students to cover the paragraph and state (or silently recall) the key details of the passage from memory. Finally, the instructor prompts students to uncover the passage and read it again to see how much of the information in the paragraph the student had been able to accurately recall. This process is repeated with all paragraphs in the passage.

Reading Fluency: Listening, Reading, And Receiving Corrective Feedback (Rose & Sherry, 1984; Van Bon, Bokseveld, Font Freide, & Van den Hurk, J.M., 1991). The student 'rehearses' a text by first following along silently as a more accomplished reader (tutor) reads a passage aloud; then the student reads the same passage aloud while receiving corrective feedback as needed. The student and tutor sit side-by-side at a table with a book between them. The tutor begins by reading aloud from the book for about 2 minutes while the student reads silently. If necessary, the tutor tracks his or her progress across the page with an index finger to help the student to keep up. At the end of the 2 minutes, the tutor stops reading and asks the student to read aloud. If the student commits a reading error or hesitates for longer than 3-5 seconds, the tutor tells the student the correct word and has the student continue reading. For each new passage, the tutor first reads the passage aloud before having the student read aloud.

Reading Fluency: Paired Reading (Topping, 1987). The student builds fluency and confidence as a reader by first reading aloud in unison with an accomplished reader, then signaling that he or she

is ready to read on alone with corrective feedback. The more accomplished reader (tutor) and student sit in a quiet location with a book positioned between them. The tutor says to the student, "Now we are going to read aloud together for a little while. Whenever you want to read alone, just tap the back of my hand like this [demonstrate] and I will stop reading. If you come to a word you don't know, I will tell you the word and begin reading with you again." Tutor and student begin reading aloud together. If the student misreads a word, the tutor points to the word and pronounces it. Then the student repeats the word. When the student reads the word correctly, tutor and student resume reading through the passage. When the child delivers the appropriate signal (a hand tap) to read independently, the tutor stops reading aloud and instead follows along silently as the student continues with oral reading. The tutor occasionally praises the student in specific terms for good reading (e.g., "That was a hard word. You did a nice job sounding it out!"). If, while reading alone, the child either commits a reading error or hesitates for longer than 5 seconds, the tutor points to the error-word and pronounces it. Then the tutor tells the student to say the word. When the student pronounces the error-word correctly, tutor and student resume reading aloud in unison. This tandem reading continues until the student again signals to read alone.

Reading Fluency: Repeated Reading (*Herman, 1985; Rashotte & Torgesen, 1985; Rasinski, 1990*). The student increases fluency in decoding by repeatedly reading the same passage while receiving help with reading errors. A more accomplished reader (tutor) sits with the student in a quiet location with a book positioned between them. The tutor selects a passage in the book of about 100 to 200 words in length. The tutor directs the student to read the passage aloud. If the student misreads a word or hesitates for longer than 5 seconds, the tutor reads the word aloud and has the student repeat the word correctly before continuing through the passage. If the student asks for help with any word, the tutor reads the word aloud. If the student requests a word definition, the tutor gives the definition. When the student has completed the passage, the tutor directs the student to read the passage again. The tutor directs the student to continue rereading the same passage until either the student has read the passage a total of 4 times or the student reads the passage at the rate of at least 85 to 100 words per minute. Then tutor and student select a new passage and repeat the process.

Word Decoding: Drilling Error Words (*Jenkins & Larson, 1979*). When students practice, drill, and receive corrective feedback on words that they misread, they can rapidly improve their vocabulary and achieve gains in reading fluency. Here are steps that the teacher or tutor will follow in the Error Word Drill: (1) When the student misreads a word during a reading session, write down the error word and date in a separate "Error Word Log". (2) At the end of the reading session, write out all error words from the reading session onto index cards. (If the student has misread more than 20 different words during the session, use just the first 20 words from your error-word list. If the student has misread fewer than 20 words, consult your "Error Word Log" and select enough additional error words from past sessions to build the review list to 20 words.) (3) Review the index cards with the student. Whenever the student pronounces a word correctly, remove that card from the deck and set it aside. (A word is considered correct if it is read correctly within 5 seconds. Self-corrected words are counted as correct if they are made within the 5-second period. Words read correctly after the 5-second period expires are counted as incorrect.) (4) When the student misses a word, pronounce the word for the student and have the student repeat the word. Then say, "What word?" and direct the student to repeat the word once more. Place the card with the missed word at the bottom of the deck. (5) Error words in deck are presented until all have been read correctly. All word cards are then gathered together, reshuffled, and presented again to the student. The drill continues until either time runs out or the student has progressed through the deck without an error on two consecutive cards.

Word Decoding: Tackling Multi-Syllabic Words (*Gleason, Archer, & Colvin, 2002*). The student uses affixes (suffixes and prefixes) and decodable 'chunks' to decode multi-syllabic words. The instructor teaches students to identify the most common prefixes and suffixes present in multi-syllable words, and trains students to readily locate and circle these affixes. The instructor also

trains students to segment the remainder of unknown words into chunks, stressing that readers do not need to divide these words into dictionary-perfect syllables. Rather, readers informally break up the word into graphemes (any grouping of letters including one or more vowels that represents a basic sound unit—or grapheme--in English). Readers then decode the mystery word by reading all affixes and graphemes in the order that they appear in that word.

Word Decoding: Teach a Hierarchy of Strategies (Haring, Lovitt, Eaton & Hansen, 1978). The student has a much greater chance of successfully decoding a difficult word when he or she uses a 'Word Attack Hierarchy'--a coordinated set of strategies that move from simple to more complex. The student uses successive strategies until solving the word. (1) When the student realizes that he or she has misread a word, the student first attempts to decode the word again. (2) Next, the student reads the entire sentence, using the context of that sentence to try to figure out the word's meaning--and pronunciation. (3) The student breaks the word into parts, pronouncing each one. (4) If still unsuccessful, the student uses an index card to cover sections of the word, each time pronouncing only the part that is visible. The student asks 'What sound does ____ make?', using phonics information to sound out the word. (5) If still unsuccessful, the student asks a more accomplished reader to read the word.

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School-Wide Strategies for Managing...

MATHEMATICS

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Mathematics instruction is a lengthy, incremental process that spans all grade levels. As children begin formal schooling in kindergarten, they develop 'number sense', an intuitive understanding of foundation number concepts and relationships among numbers. A central part of number sense is the student's ability to internalize the number line as a precursor to performing mental arithmetic. As students progress through elementary school, they must next master common math operations (addition, subtraction, multiplication, and division) and develop fluency in basic arithmetic combinations ('math facts'). In later grades, students transition to applied, or 'word', problems that relate math operations and concepts to real-world situations. Successful completion of applied problems requires that the student understand specialized math vocabulary, identify the relevant math operations needed to solve the problem while ignoring any unnecessary information also appearing in that written problem, translate the word problem from text format into a numeric equation containing digits and math symbols, and then successfully solve. It is no surprise, then, that there are a number of potential blockers to student success with applied problems, including limited reading decoding and comprehension skills, failure to acquire fluency with arithmetic combinations (math facts), and lack of proficiency with math operations. Deciding what specific math interventions might be appropriate for any student must therefore be a highly individualized process, one that is highly dependent on the student's developmental level and current math skills, the requirements of the school district's math curriculum, and the degree to which the student possesses or lacks the necessary auxiliary skills (e.g., math vocabulary, reading comprehension) for success in math. Here are some wide-ranging classroom (Tier I RTI) ideas for math interventions that extend from the primary through secondary grades.

Applied Problems: Encourage Students to Draw to Clarify Understanding (*Van Essen & Hamaker, 1990; Van Garderen, 2006*). Making a drawing of an applied, or 'word', problem is one easy heuristic tool that students can use to help them to find the solution. An additional benefit of the drawing strategy is that it can reveal to the teacher any student misunderstandings about how to set up or solve the word problem. To introduce students to the drawing strategy, the teacher hands out a worksheet containing at least six word problems. The teacher explains to students that making a picture of a word problem sometimes makes that problem clearer and easier to solve. The teacher and students then independently create drawings of each of the problems on the worksheet. Next, the students show their drawings for each problem, explaining each drawing and how it relates to the word problem. The teacher also participates, explaining his or her drawings to the class or group. Then students are directed independently to make drawings as an intermediate problem-solving step when they are faced with challenging word problems. NOTE: This strategy appears to be more effective when used in later, rather than earlier, elementary grades.

Applied Problems: Improving Performance Through a 4-Step Problem-Solving Approach (*Pólya, 1957; Williams, 2003*). Students can consistently perform better on applied math problems if they follow an efficient 4-step plan of understanding the problem, devising a plan, carrying out the plan, and looking back. (1) UNDERSTAND THE PROBLEM. To fully grasp the problem, the student may restate the problem in his or her own words, note key information, and identify missing information. (2) DEVISE A PLAN. In mapping out a strategy to solve the problem, the student may make a table, draw a diagram, or translate the verbal problem into an equation. (3) CARRY OUT THE PLAN. The student implements the steps in the plan, showing work and checking work for each step. (4) LOOK BACK. The student checks the results. If the answer is written as an equation, the student puts the results in words and checks whether the answer addresses the question posed in the original word problem.

Math Computation: Boost Fluency Through Explicit Time-Drills (*Rhymer, Skinner, Jackson, McNeill, Smith & Jackson, 2002; Skinner, Pappas & Davis, 2005; Woodward, 2006*). Explicit time-drills are a method to boost students' rate of responding on math-fact worksheets. The teacher hands out the worksheet. Students are told that they will have 3 minutes to work on problems on the sheet. The teacher starts the stop watch and tells the students to start work. At the end of the first minute in the 3-minute span, the teacher 'calls time', stops the stopwatch, and tells the students to underline the last number written and to put their pencils in the air. Then students are told to resume work and the teacher restarts the stopwatch. This process is repeated at the end of minutes 2 and 3. At the conclusion of the 3 minutes, the teacher collects the student worksheets. TIPS: Explicit time-drills work best on 'simple' math facts requiring few computation steps. They are less effective on more complex math facts. Also, a less intrusive and more flexible version of this intervention is to use time-prompts while students are working independently on math facts to speed their rate of responding. For example, at the end of every minute of seatwork, the teacher can call the time and have students draw a line under the item that they are working on when that minute expires.

Math Computation: Motivate With 'Errorless Learning' Worksheets (*Caron, 2007*). Reluctant students can be motivated to practice math number problems to build computational fluency when given worksheets that include an answer key (number problems with correct answers) displayed at the top of the page. In this version of an 'errorless learning' approach, the student is directed to complete math facts as quickly as possible. If the student comes to a number problem that he or she cannot solve, the student is encouraged to locate the problem and its correct answer in the key at the top of the page and write it in. Such speed drills build computational fluency while promoting students' ability to visualize and to use a mental number line. TIP: Consider turning this activity into a 'speed drill'. The student is given a kitchen timer and instructed to set the timer for a predetermined span of time (e.g., 2 minutes) for each drill. The student completes as many problems as possible before the timer rings. The student then graphs the number of problems correctly computed each day on a time-series graph, attempting to better his or her previous score.

Math Computation: Two Ideas to Jump-Start Active Academic Responding (*Skinner, Pappas & Davis, 2005*). Research shows that when teachers use specific techniques to motivate their classes to engage in higher rates of active and accurate academic responding, student learning rates are likely to go up. Here are two ideas to accomplish increased academic responding on math tasks. First, break longer assignments into shorter assignments with performance feedback given after each shorter 'chunk' (e.g., break a 20-minute math computation worksheet task into 3 seven-minute assignments). Breaking longer assignments into briefer segments also allows the teacher to praise struggling students more frequently for work completion and effort, providing an additional 'natural' reinforcer. Second, allow students to respond to easier practice items orally rather than in written form to speed up the rate of correct responses.

Math Homework: Motivate Students Through Reinforcers, Interesting Assignments, Homework Planners, and Self-Monitoring (*Bryan & Sullivan-Burstein, 1998*). Improve students' rate of homework completion and quality by using reinforcers, motivating 'real-life' assignments, a homework planner, and student self-monitoring. (1) Reinforcers: Allow students to earn a small reward (e.g., additional free time) when they turn in all homework assignments for the week. (2) 'Real-life' Assignments: Make homework meaningful by linking concepts being taught to students' lives. In a math lesson on estimating area, for example, give students the homework task of calculating the area of their bedroom and estimating the amount of paint needed to cover the walls. (3) Homework Planner: Teach students to use a homework planner to write down assignments, organize any materials (e.g., worksheets) needed for homework, transport completed homework safely back to school, and provide space for parents and teachers to communicate about homework via written school-home notes. (4) Student Self-Monitoring: Direct students to chart their homework completion each week. Have students plot the number of assignments turned in on-time in green, assignments not turned in at all in red, and assignments turned in late in yellow.

Math Instruction: Consolidate Student Learning During Lecture Through the Peer-Guided Pause (*Hawkins, & Brady, 1994*). During large-group math lectures, teachers can help students to retain more instructional content by incorporating brief Peer Guided Pause sessions into lectures. Students are trained to work in pairs. At one or more appropriate review points in a lecture period, the instructor directs students to pair up to work together for 4 minutes. During each Peer Guided Pause, students are given a worksheet that contains one or more correctly completed word or number problems illustrating the math concept(s) covered in the lecture. The sheet also contains several additional, similar problems that pairs of students work cooperatively to complete, along with an answer key. Student pairs are reminded to (a) monitor their understanding of the lesson concepts; (b) review the correctly math model problem; (c) work cooperatively on the additional problems, and (d) check their answers. The teacher can direct student pairs to write their names on the practice sheets and collect them as a convenient way to monitor student understanding.

Math Instruction: Increase Student Engagement and Improve Group Behaviors With Response Cards (*Armendariz & Umbreit, 1999; Lambert, Cartledge, Heward & Lo, 2006*). Response cards can increase student active engagement in group math activities while reducing disruptive behavior. In the group-response technique, all students in the classroom are supplied with an erasable tablet ('response card'), such as a chalk slate or laminated white board with erasable marker. The teacher instructs at a brisk pace. The instructor first poses a question to the class. Students are given sufficient wait time for each to write a response on his or her response card. The teacher then directs students to present their cards. If most or all of the class has the correct answer, the teacher praises the group. If more than one quarter of the students records an incorrect answer on their cards, however, the teacher uses guided questions and demonstration to steer students to the correct answer.

Math Instruction: Maintain a Supportive Atmosphere for Classroom "Math Talk" (*Cooke & Adams, 1998*). Teachers can promote greater student 'risk-taking' in mathematics learning when they cultivate a positive classroom atmosphere for math discussions while preventing peers from putting each other down. The teacher models behavioral expectations for open, interactive discussions, praises students for their class participation and creative attempts at problem-solving, and regularly points out that incorrect answers and misunderstandings should be celebrated—as they often lead to breakthroughs in learning. The teacher uses open-ended comments (e.g., "What led you to that answer?") as tools to draw out students and encourage them to explore and apply math concepts in group discussion. Students are also encouraged in a supportive manner to evaluate each other's reasoning. However, the teacher intervenes immediately to prevent negative student comments or 'put-downs' about peers. As with any problem classroom behavior, a first offense requires that the student meet privately with the instructor to discuss teacher expectations for positive classroom behavior. If the student continues to put down peers, the teacher imposes appropriate disciplinary consequences.

Math Instruction: Support Students Through a Wrap-Around Instruction Plan (*Montague, 1997; Montague, Warger & Morgan, 2000*). When teachers instruct students in more complex math cognitive strategies, they must support struggling learners with a 'wrap-around' instructional plan. That plan incorporates several elements: (a) Assessment of the student's problem-solving skills. The instructor first verifies that the student has the necessary academic competencies to learn higher-level math content, including reading and writing skills, knowledge of basic math operations, and grasp of required math vocabulary. (b) Explicit instruction. The teacher presents new math content in structured, highly organized lessons. The instructor also uses teaching tools such as Guided Practice (moving students from known material to new concepts through a thoughtful series of teacher questions) and 'overlearning' (teaching and practicing a skill with the class to the point at which students develop automatic recall and control of it). (c) Process modeling. The teacher adopts a 'think aloud' approach, or process modeling, to verbally reveal his or her cognitive process to the class while using a cognitive strategy to solve a math problem. In turn, students are encouraged to think aloud when applying the same strategy—first as part of a whole-class or cooperative learning group, then independently. The teacher observes students

during process modeling to verify that they are correctly applying the cognitive strategy. (d) Performance feedback. Students get regular performance feedback about their level of mastery in learning the cognitive strategy. That feedback can take many forms, including curriculum-based measurement, timely corrective feedback, specific praise and encouragement, grades, and brief teacher conferences. (e) Review of mastered skills or material. Once the student has mastered a cognitive strategy, the teacher structures future class lessons or independent work to give the student periodic opportunities to use and maintain the strategy. The teacher also provides occasional brief 'booster sessions', reteaching steps of the cognitive strategy to improve student retention.

Math Instruction: Unlock the Thoughts of Reluctant Students Through Class Journaling

(Baxter, Woodward & Olson, 2005). Students can effectively clarify their knowledge of math concepts and problem-solving strategies through regular use of class 'math journals'. Journaling is a valuable channel of communication about math issues for students who are unsure of their skills and reluctant to contribute orally in class. At the start of the year, the teacher introduces the journaling assignment, telling students that they will be asked to write and submit responses at least weekly to teacher-posed questions. At first, the teacher presents 'safe' questions that tap into the students' opinions and attitudes about mathematics (e.g., 'How important do you think it is nowadays for cashiers in fast-food restaurants to be able to calculate in their head the amount of change to give a customer?'). As students become comfortable with the journaling activity, the teacher starts to pose questions about the students' own mathematical thinking relating to specific assignments. Students are encouraged to use numerals, mathematical symbols, and diagrams in their journal entries to enhance their explanations. The teacher provides brief written comments on individual student entries, as well as periodic oral feedback and encouragement to the entire class on the general quality and content of class journal responses. Regular math journaling can prod students to move beyond simple 'rote' mastery of the steps for completing various math problems toward a deeper grasp of the math concepts that underlie and explain a particular problem-solving approach. Teachers will find that journal entries are a concrete method for monitoring student understanding of more abstract math concepts. To promote the quality of journal entries, the teacher might also assign them an effort grade that will be calculated into quarterly math report card grades.

Math Problem-Solving: Help Students Avoid Errors With the 'Individualized Self-Correction Checklist'

(Zbiec Uberti, Mastropieri & Scruggs, 2004). Students can improve their accuracy on particular types of word and number problems by using an 'individualized self-instruction checklist' that reminds them to pay attention to their own specific error patterns. To create such a checklist, the teacher meets with the student. Together they analyze common error patterns that the student tends to commit on a particular problem type (e.g., 'On addition problems that require carrying, I don't always remember to carry the number from the previously added column.'). For each type of error identified, the student and teacher together describe the appropriate step to take to prevent the error from occurring (e.g., 'When adding each column, make sure to carry numbers when needed.'). These self-check items are compiled into a single checklist. Students are then encouraged to use their individualized self-instruction checklist whenever they work independently on their number or word problems. As older students become proficient in creating and using these individualized error checklists, they can begin to analyze their own math errors and to make their checklists independently whenever they encounter new problem types.

Math Review: Balance Massed & Distributed Practice (Carnine, 1997). Teachers can best promote students acquisition and fluency in a newly taught math skill by transitioning from massed to distributed practice. When students have just acquired a math skill but are not yet fluent in its use, they need lots of opportunities to try out the skill under teacher supervision—a technique sometimes referred to as 'massed practice'. Once students have developed facility and independence with that new math skill, it is essential that they then be required periodically to use the skill in order to embed and retain it—a strategy also known as 'distributed practice'. Teachers can program distributed practice of a math skill such as reducing fractions to least common

denominators into instruction either by (a) regularly requiring the student to complete short assignments in which they practice that skill in isolation (e.g., completing drill sheets with fractions to be reduced), or (b) teaching a more advanced algorithm or problem-solving approach that incorporates--and therefore requires repeated use of--the previously learned math skill (e.g., requiring students to reduce fractions to least-common denominators as a necessary first step to adding the fractions together and converting the resulting improper fraction to a mixed number).

Math Review: Teach Effective Test-Preparation Strategies (Hong, Sas, & Sas, 2006). A comparison of the methods that high and low-achieving math students typically use to prepare for tests suggests that struggling math students need to be taught (1) specific test-review strategies and (2) time-management and self-advocacy skills. Among review-related strategies, deficient test-takers benefit from explicit instruction in how to take adequate in-class notes; to adopt a systematic method to review material for tests (e.g., looking over their notes each night, rereading relevant portions of the math text, reviewing handouts from the teacher, etc.), and to give themselves additional practice in solving problems (e.g., by attempting all homework items, tackling additional problems from the text book, and solving problems included in teacher handouts). Deficient test-takers also require pointers in how to allocate and manage their study time wisely, to structure their study environment to increase concentration and reduce distractions, as well as to develop 'self-advocacy' skills such as seeking additional help from teachers when needed. Teachers can efficiently teach effective test-preparation methods as a several-session whole-group instructional module.

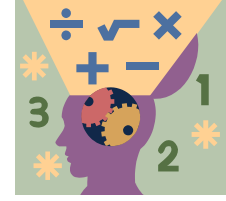
Math Vocabulary: Preteach, Model, and Use Standard Math Terms (Chard, D., n.d.). Three strategies can help students to learn essential math vocabulary: preteaching key vocabulary items, modeling those vocabulary words, and using only universally accepted math terms in instruction. (1) Preteach key math vocabulary. Math vocabulary provides students with the language tools to grasp abstract mathematical concepts and to explain their own reasoning. Therefore, do not wait to teach that vocabulary only at 'point of use'. Instead, preview relevant math vocabulary as a regular a part of the 'background' information that students receive in preparation to learn new math concepts or operations. (2) Model the relevant vocabulary when new concepts are taught. Strengthen students' grasp of new vocabulary by reviewing a number of math problems with the class, each time consistently and explicitly modeling the use of appropriate vocabulary to describe the concepts being taught. Then have students engage in cooperative learning or individual practice activities in which they too must successfully use the new vocabulary—while the teacher provides targeted support to students as needed. (3) Ensure that students learn standard, widely accepted labels for common math terms and operations and that they use them consistently to describe their math problem-solving efforts.

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Math Computation: Increase Accuracy By Intermixing Easy and Challenging Problems



Teachers can improve accuracy and positively influence the attitude of students when completing math-fact worksheets by intermixing 'easy' problems among the 'challenging' problems. Research shows that students are more motivated to complete computation worksheets when they contain some very easy problems interspersed among the more challenging items.

Materials

- Math computation worksheets & answer keys with a mixture of difficult and easy problems

Steps to Implementing This Intervention

1. The teacher first identifies one or more 'challenging' problem-types that are matched to the student's current math-computation abilities (e.g., multiplying a 2-digit number by a 2-digit number with regrouping).
2. The teacher next identifies an 'easy' problem-type that the students can complete very quickly (e.g., adding or subtracting two 1-digit numbers).
3. The teacher then creates a series of student math computation worksheets with 'easy' computation problems interspersed at a fixed rate among the 'challenging' problems. (NOTE: Instructions are included below for creating interspersal worksheets using a free online application from www.interventioncentral.org.)
 - If the student is expected to complete the worksheet independently as seat work or homework, 'challenging' and 'easy' problems should be interspersed at a 1:1 ratio (that is, every 'challenging' problem in the worksheet is followed by an 'easy' problem).
 - If the student is to have the problems read aloud and then asked to solve the problems mentally and write down only the answer, the items should appear on the worksheet at a ratio of 3:1 (that is, every third 'challenging' problem is followed by an 'easy' one).

Directions for On-Line Creation of Worksheets With a Mix of Easy and Challenging Computation Problems ('Interspersal Worksheets')

By following the directions below, teachers can use a free on-line Math Worksheet Generator to create computation worksheets with easy problems interspersed among more challenging ones:

- The teacher goes to the following URL for the Math Worksheet Generator:
<http://www.interventioncentral.org/htmldocs/tools/mathprobe/allmult.php>

- Displayed on that Math Worksheet Generator web page is a series of math computation goals for addition, subtraction, multiplication, and division. Teachers can select up to five different problem types to appear on a student worksheet. Each problem type is selected by clicking on the checkbox next to it.
- It is simple to create a worksheet with a 1:1 ratio of challenging and easy problems (that is, with an easy problem following every challenging problem). First, the teacher clicks the checkbox next to an 'easy' problem type that the student can compute very quickly (e.g., adding or subtracting two 1-digit numbers). Next the teacher selects a 'challenging' problem type that is instructionally appropriate for the student (e.g., multiplying a 2-digit number by a 2-digit number with regrouping). Then the teacher clicks the 'Multiple Skill Computation Probe' button. The computer program will then automatically create a student computation worksheet and teacher answer key with alternating easy and challenging problems.
- It is also no problem to create a worksheet with a higher (e.g., 2:1, 3:1, or 4:1) ratio of challenging problems to easy problems. The teacher first clicks the checkbox next to an 'easy' problem type that the student can compute very quickly (e.g., adding or subtracting two 1-digit numbers). The teacher then selects up to four different challenging problem types that are instructionally appropriate to the student. Depending on the number of challenging problem-types selected, when the teacher clicks the 'Multiple Skill Computation Probe' button, the computer program will create a student computation worksheet and teacher answer key that contain 2 (or 3 or 4) challenging problems for every easy problem.

Because the computer program generates new worksheets each time it is used, the teacher can enter the desired settings and –in one sitting-- create and print off enough worksheets and answer keys to support a six- or eight-week intervention.

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Combining Cognitive & Metacognitive Strategies to Assist Students With Mathematical Problem Solving

Solving an advanced math problem independently requires the coordination of a number of complex skills. The student must have the capacity to reliably implement the specific steps of a particular problem-solving process, or cognitive strategy. At least as important, though, is that the student must also possess the necessary metacognitive skills to analyze the problem, select an appropriate strategy to solve that problem from an array of possible alternatives, and monitor the problem-solving process to ensure that it is carried out correctly.

The following strategies combine both cognitive and metacognitive elements (Montague, 1992; Montague & Dietz, 2009). First, the student is taught a 7-step process for attacking a math word problem (cognitive strategy). Second, the instructor trains the student to use a three-part self-coaching routine for each of the seven problem-solving steps (metacognitive strategy).

In the cognitive part of this multi-strategy intervention, the student learns an explicit series of steps to analyze and solve a math problem. Those steps include:

1. **Reading the problem.** The student reads the problem carefully, noting and attempting to clear up any areas of uncertainty or confusion (e.g., unknown vocabulary terms).
2. **Paraphrasing the problem.** The student restates the problem in his or her own words.
3. **'Drawing' the problem.** The student creates a drawing of the problem, creating a visual representation of the word problem.
4. **Creating a plan to solve the problem.** The student decides on the best way to solve the problem and develops a plan to do so.
5. **Predicting/Estimating the answer.** The student estimates or predicts what the answer to the problem will be. The student may compute a quick approximation of the answer, using rounding or other shortcuts.
6. **Computing the answer.** The student follows the plan developed earlier to compute the answer to the problem.
7. **Checking the answer.** The student methodically checks the calculations for each step of the problem. The student also compares the actual answer to the estimated answer calculated in a previous step to ensure that there is general agreement between the two values.

The metacognitive component of the intervention is a three-part routine that follows a sequence of 'Say', 'Ask', 'Check'. For each of the 7 problem-solving steps reviewed above:

- The student first self-instructs by stating, or 'saying', the purpose of the step ('Say').
- The student next self-questions by 'asking' what he or she intends to do to complete the step ('Ask').
- The student concludes the step by self-monitoring, or 'checking', the successful completion of the step ('Check').

While the Say-Ask-Check sequence is repeated across all 7 problem-solving steps, the actual content of the student self-coaching comments changes across the steps.

Table 1 shows how each of the steps in the word problem cognitive strategy is matched to the three-part Say-Ask-Check sequence:

Table 1: 'Say-Ask-Check' Metacognitive Prompts Tied to a Word-Problem Cognitive Strategy (Montague, 1992)		
Cognitive Strategy Step	Metacognitive 'Say-Ask-Check' Prompt Targets	Sample Metacognitive 'Say-Ask-Check' Prompts
1. Read the problem.	<p>'Say' (Self-Instruction) Target: <i>The student reads and studies the problem carefully before proceeding.</i></p> <p>'Ask' (Self-Question) Target: <i>Does the student fully understand the problem?</i></p> <p>'Check' (Self-Monitor) Target: <i>Proceed only if the problem is understood.</i></p>	<p>Say: "I will read the problem. I will reread the problem if I don't understand it."</p> <p>Ask: "Now that I have read the problem, do I fully understand it?"</p> <p>Check: "I understand the problem and will move forward."</p>
2. Paraphrase the problem.	<p>'Say' (Self-Instruction) Target: <i>The student restates the problem in order to demonstrate understanding.</i></p> <p>'Ask' (Self-Question) Target: <i>Is the student able to paraphrase the problem?</i></p> <p>'Check' (Self-Monitor) Target: <i>Ensure that any highlighted key words are relevant to the question.</i></p>	<p>Say: "I will highlight key words and phrases that relate to the problem question."</p> <p>"I will restate the problem in my own words."</p> <p>Ask: "Did I highlight the most important words or phrases in the problem?"</p> <p>Check: "I found the key words or phrases that will help to solve the problem."</p>
3. 'Draw' the problem.	<p>'Say' (Self-Instruction) Target: <i>The student creates a drawing of the problem to consolidate understanding.</i></p> <p>'Ask' (Self-Question) Target: <i>Is there a match between the drawing and the problem?</i></p> <p>'Check' (Self-Monitor) Target: <i>The drawing includes in visual form the key elements of the math problem.</i></p>	<p>Say: "I will draw a diagram of the problem."</p> <p>Ask: "Does my drawing represent the problem?"</p> <p>Check: "The drawing contains the essential parts of the problem."</p>
4. Create a plan to solve the problem.	<p>'Say' (Self-Instruction) Target: <i>The student generates a plan to solve the problem.</i></p> <p>'Ask' (Self-Question) Target: <i>What plan will help the student to solve this problem?</i></p> <p>'Check' (Self-Monitor) Target: <i>The plan is appropriate to solve the problem.</i></p>	<p>Say: "I will make a plan to solve the problem."</p> <p>Ask: "What is the first step of this plan? What is the next step of the plan?"</p> <p>Check: "My plan has the right steps to solve the problem."</p>
5. Predict/estimate the	<p>'Say' (Self-Instruction) Target: <i>The student uses estimation or other strategies to predict or</i></p>	<p>Say: "I will estimate what the answer will be."</p>

Answer.	<i>estimate the answer.</i> 'Ask' (Self-Question) Target: <i>What estimating technique will the student use to predict the answer?</i> 'Check' (Self-Monitor) Target: <i>The predicted/estimated answer used all of the essential problem information.</i>	Ask: "What numbers in the problem should be used in my estimation?" Check: "I did not skip any important information in my estimation."
6. Compute the answer.	'Say' (Self-Instruction) Target: <i>The student follows the plan to compute the solution to the problem.</i> 'Ask' (Self-Question) Target: <i>Does the answer agree with the estimate?</i> 'Check' (Self-Monitor) Target: <i>The steps in the plan were followed and the operations completed in the correct order.</i>	Say: "I will compute the answer to the problem." Ask: "Does my answer sound right?" "Is my answer close to my estimate?" Check: "I carried out all of the operations in the correct order to solve this problem."
7. Check the answer.	'Say' (Self-Instruction) Target: <i>The student reviews the computation steps to verify the answer.</i> 'Ask' (Self-Question) Target: <i>Did the student check all the steps in solving the problem and are all computations correct?</i> 'Check' (Self-Monitor) Target: <i>The problem solution appears to have been done correctly.</i>	Say: "I will check the steps of my answer." Ask: "Did I go through each step in my answer and check my work?" Check: ""

Students will benefit from close teacher support when learning to combine the 7-step cognitive strategy to attack math word problems with the iterative 3-step metacognitive Say-Ask-Check sequence. Teachers can increase the likelihood that the student will successfully acquire these skills by using research-supported instructional practices (Burns, VanDerHeyden, & Boice, 2008), including:

- Verifying that the student has the necessary foundation skills to solve math word problems
- Using explicit instruction techniques to teach the cognitive and metacognitive strategies
- Ensuring that all instructional tasks allow the student to experience an adequate rate of success
- Providing regular opportunities for the student to be engaged in active accurate academic responding
- Offering frequent performance feedback to motivate the student and shape his or her learning.

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School-Wide Strategies for Managing... WRITING

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The act of writing contains its own inner tensions. Writers must abide by a host of rules that govern the mechanics and conventions of writing yet are also expected—within the constraints of those rules-- to formulate original, even creative, thoughts. It is no wonder that many students find writing to be a baffling exercise and have little sense of how to break larger writing assignments into predictable, achievable subtasks. But of course writing can be taught and writing can be mastered. The best writing instruction places the process of written expression on a timeline: Good writers first plan their writing. Then they write. Once a draft has been created, good writers review and revise their work. While the stages of the writing process are generally sequential, good writers also find themselves jumping frequently between these stages (for example, collecting additional notes and writing new sections of a paper as part of the revision process). Depending upon their stage of development as writers, struggling student writers may benefit from the following strategies:

Content: Memorize a Story Grammar Checklist (*Reid & Lienemann, 2006*). Students write lengthier stories that include greater detail when they use a memorized strategy to judge their writing-in-progress. These young writers are taught a simple mnemonic device with 7 elements: 'WWW, What=2, How = 2'. This mnemonic translates into a story grammar checklist: WHO the main character is; WHERE the story takes place; WHEN the story occurs; WHAT the main character(s) do or plan to do; WHAT happens next; HOW the story concludes; and HOW the character(s) feel about their experiences. Students are taught this strategy through teacher demonstration, discussion, teacher modeling; and student use of the strategy with gradually fading teacher support. When students use the 'WWW, What=2, How = 2' tactic independently, they may still need occasional prompting to use it in their writing. NOTE: Teachers can apply this intervention idea to any genre of writing (e.g., persuasive essay), distilling its essential elements into a similar short, easily memorized checklist to teach to students.

Fluency: Have Students Write Every Day (*Graham, Harris & Larsen, 2001*). Short daily writing assignments can build student writing fluency and make writing a more motivating activity. For struggling writers, formal writing can feel much like a foreign language, with its own set of obscure grammatical rules and intimidating vocabulary. Just as people learn another language more quickly and gain confidence when they use it frequently, however, poor writers gradually develop into better writers when they are prompted to write daily--and receive rapid feedback and encouragement about that writing. The teacher can encourage daily writing by giving short writing assignments, allowing time for students to journal about their learning activities, requiring that they correspond daily with pen pals via email, or even posting a question on the board as a bell-ringer activity that students can respond to in writing for extra credit. Short daily writing tasks have the potential to lower students' aversion to writing and boost their confidence in using the written word.

Fluency: Self-Monitor and Graph Results to Increase Writing Fluency (*Rathvon, 1999*). Students gain motivation to write through daily monitoring and charting of their own and classwide rates of writing fluency. At least several times per week, assign your students timed periods of 'freewriting' when they write in their personal journals. Freewriting periods all the same amount of time each day. After each freewriting period, direct each student to count up the number of words he or she has written in the daily journal entry (whether spelled correctly or not). Next, tell students to record their personal writing-fluency score in their journal and also chart the score on their own time-series graph for visual feedback. Then collect the day's writing-fluency scores of all students in the class, sum those scores, and chart the results on a large time-series graph posted at the front of the room. At the start of each week, calculate that week's goal of increasing total class

words written by taking last week's score and increasing by five percent. At the end of each week, review the class score and praise students if they have shown good effort.

Instruction: Essentials of Good Teaching Benefit Struggling Writers (*Gersten, Baker, & Edwards, 1999*). Teachers are most successful in reaching students with writing delays when their instruction emphasizes the full writing process, provides strategy sheets, offers lots of models of good writing, and gives students timely editorial feedback. Good instructors build their written expression lessons around the 3 stages of writing—planning, writing, and revision—and make those stages clear and explicit. Skilled instructors also provide students with 'think sheets' that outline step-by-step strategies for tackle the different phases of a writing assignment (e.g., taking concise notes from research material; building an outline; proofreading a draft). Students become stronger writers when exposed to different kinds of expressive text, such as persuasive, narrative, and expository writing. Teachers can make students more confident and self-sufficient as writers when they give them access to plentiful examples of good prose models that the student can review when completing a writing assignment. Finally, strong writing teachers provide supportive and timely feedback to students about their writing. When teachers or classmates offer writing feedback to the student, they are honest but also maintain an encouraging tone.

Motivation: Stimulate Interest With an Autobiography Assignment (*Bos & Vaughn, 2002*). Assigning the class to write their own autobiographies can motivate hard-to-reach students who seem uninterested in most writing assignments. Have students read a series of autobiographies of people who interest them. Discuss these biographies with the class. Then assign students to write their own autobiographies. (With the class, create a short questionnaire that students can use to interview their parents and other family members to collect information about their past.) Allow students to read their finished autobiographies for the class.

Organization: Build an Outline by Talking Through the Topic (*The Writing Center, University of North Carolina at Chapel Hill, n.d./23 December 2006*). Students who struggle to organize their notes into a coherent outline can tell others what they know about the topic—and then capture the informal logical structure of that conversation to create a working outline. The student studies notes from the topic and describes what he or she knows about the topic and its significance to a listener. (The student may want to audio-record this conversation for later playback.) After the conversation, the student jots down an outline from memory to capture the structure and main ideas of the discussion. This outline 'kernel' can then be expanded and refined into the framework for a paper.

Organization: 'Reverse Outline' the Draft (*The Writing Center, University of North Carolina at Chapel Hill, n.d./23 December 2006*). Students can improve the internal flow of their compositions through 'reverse outlining'. The student writes a draft of the composition. Next, the student reads through the draft, jotting notes in the margins that signify the main idea of each paragraph or section. Then the student organizes the margin notes into an outline to reveal the organizational structure of the paper. This 'reverse outline' allows the student to note whether sections of the draft are repetitious, are out of order, or do not logically connect with one another.

Planning: Brainstorm to Break the 'Idea' Logjam (*The Writing Center, University of North Carolina at Chapel Hill, n.d./28 December 2006*). Brainstorming is a time-tested method that can help students to generate motivating topics for writing assignments and uncover new ideas to expand and improve their compositions. Here are four brainstorming strategies to teach to students: **FREEWITING**: The student sets a time limit (e.g., 15 minutes) or length limit (e.g., one hand-written page) and spontaneously writes until the limit is reached. The writer does not judge the writing but simply writes as rapidly as possible, capturing any thought that comes to mind on the topic. Later, the student reviews the freewriting to pick out any ideas, terms, or phrasing that might be incorporated into the writing assignment. **LISTING**: The student selects a topic based on an idea or key term related to the writing assignment. The writer then rapidly brainstorms a list of any items that might possibly relate to the topic. Finally, the writer reviews the list to select items that

might be useful in the assigned composition or trigger additional writing ideas. **SIMILES:** The student selects a series of key terms or concepts linked to the writing assignment. The student brainstorms, using the framework of a simile: " _1_ is like _2_." The student plugs a key term into the first blank and then generates as many similes as possible (e.g., "A SHIP is like a CITY ON THE SEA."). **REFERENCES:** The student jots down key ideas or terms from the writing assignment. He or she then browses through various reference works (dictionaries, encyclopedias, specialized reference works on specific subjects) looking randomly for entries that trigger useful ideas. (Writers might try a variation of this strategy by typing assignment-related search terms into GOOGLE or another online search engine.)

Proofreading: Teach A Memory Strategy (*Bos & Vaughn, 2002*). When students regularly use a simple, portable, easily memorized plan for proofreading, the quality of their writing can improve significantly. Create a poster to be put up in the classroom summarizing the SCOPE proofreading elements: (1) **SPELLING:** Are my words spelled correctly; (2) **CAPITALIZATION:** Have I capitalized all appropriate words, including first words of sentences, proper nouns, and proper names?; (3) **ORDER of words:** Is my word order (syntax) correct?; (4) **PUNCTUATION:** Did I use end punctuation and other punctuation marks appropriately? (5) **EXPRESSION of complete thoughts:** Do all of my sentences contain a noun and verb to convey a complete thought? Review the SCOPE proofreading steps by copying a first-draft writing sample onto an overhead and evaluating the sample with the class using each item from the SCOPE poster. Then direct students to pair off and together evaluate their own writing samples using SCOPE. When students appear to understand the use of the SCOPE plan, require that they use this strategy to proofread all written assignments before turning them in.

Proofreading: Use Selective Proofreading With Highlighting of Errors (*Frus, n.d./18 November 2006*). To prevent struggling writers from becoming overwhelmed by teacher proofreading corrections, focus on only 1 or 2 proofreading areas when correcting a writing assignment. Create a student 'writing skills checklist' that inventories key writing competencies (e.g., grammar/syntax, spelling, vocabulary, etc.). For each writing assignment, announce to students that you will grade the assignment for overall content but will make proofreading corrections on only 1-2 areas chosen from the writing skills checklist. (Select different proofreading targets for each assignment matched to common writing weaknesses in your classroom.) Also, to prevent cluttering the student's paper with potentially discouraging teacher comments and editing marks, underline problems in the student's text with a highlighter and number the highlighted errors sequentially at the left margin of the student paper. Then (if necessary) write teacher comments on a separate feedback sheet to explain the writing errors. (Identify each comment with the matching error-number from the left margin of the student's worksheet.) With fewer proofreading comments, the student can better attend to the teacher feedback. Also, even a heavily edited student assignment looks neat and tidy when teachers use the highlighting/numbering technique—preventing students from becoming disheartened at the site of an assignment scribbled over with corrective comments.

Spelling: Leverage the Power of Memory Through Cover-Copy-Compare (*Murphy, Hern, Williams, & McLaughlin, 1990*). Students increase their spelling knowledge by copying a spelling word from a correct model and then recopying the same word from memory. Give students a list of 10-20 spelling words, an index card, and a blank sheet of paper. For each word on the spelling list, the student (1) copies the spelling list item onto a sheet of paper, (2) covers the newly copied word with the index card, (3) writes the spelling word again on the sheet (spelling it from memory), and (4) uncovers the copied word and checks to ensure that the word copied from memory is spelled correctly. If that word is spelled incorrectly, the student repeats the sequence above until the word copied from memory is spelled correctly--then moves to the next word on the spelling list.

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Sentence Combining: Teaching Rules of Sentence Structure by Doing

Students with poor writing skills often write sentences that lack 'syntactic maturity' (Robinson & Howell, 2008). That is, these writers' sentences often follow a simple, stereotyped format. In public schools, grammar skills have traditionally been taught in isolation to give students the advanced writing knowledge required to master a diverse range of sentence structures. However, isolated grammar instruction appears to have little or no positive impact in helping poor writers become better writers (Graham & Perin, 2007). A promising alternative is to use sentence combining (Graham & Perin, 2007; Strong, 1986). In this approach, students are presented with kernel sentences and given explicit instruction in how to weld these kernel sentences into more diverse sentence types either by using connecting words to combine multiple sentences into one or by isolating key information from an otherwise superfluous sentence and embedding that important information into the base sentence.

In a simple demonstration of sentence combining, a student may generate these two sentences in her composition on the American Revolution: *The American army had few supplies in the winter of 1776. The American army had few trained military leaders.*

The instructor might meet with the student and have the student recopy the two sentences in this format:

The American army had few supplies in the winter of 1776.
The American army had few trained military leaders. (and)

The student would be encouraged to combine the two shorter sentences into a more comprehensive sentence by using the connecting word (coordinating conjunction) 'and' to combine objects: *The American army had few supplies and few trained military leaders in the winter of 1776.*

Formatting Sentence Combining Examples

These simple formatting conventions are used in sentence-combining exercises (Saddler, 2005; Strong, 1986):

- In each example, the base clause (sentence) appears first. Any sentence(s) to be combined or embedded with the base clause appear below that base clause.

Example: Base clause: The dog ran after the bus.
Sentence to be embedded: The dog is yellow.
Student-Generated Solution: *The yellow dog ran after the bus.*

- 'Connecting words' to be used as a sentence-combining tool appear in parentheses at the end of a sentence that is to be combined with the base clause.

Example: Base clause: The car stalled.
Sentence to be combined: The car ran out of gas. (because)
Student-Generated Solution: *The car stalled because it ran out of gas.*

- The element(s) of any sentence to be embedded in the base clause are underlined.

Example: **Base clause:** The economic forecast resulted in strong stock market gains.

Sentence to be embedded: The economic forecast was upbeat.

Student-Generated Solution: *The upbeat economic forecast resulted in strong stock market gains.*

Using Sentence Combining in Instruction

Teachers who use sentence combining in their writing instruction should follow a direct-instruction approach (Saddler, 2005). The instructor fosters a learning atmosphere that encourages students to take risks when participating in sentence-combining activities. When first introducing sentence-combining to the class, the instructor explains that using varied sentence structures helps writers to better convey meaning. The instructor tells students that there are often multiple correct ways to combine sentences. The instructor completes several sentence-combining examples in front of the group, using a think-aloud approach to show his or her thinking process in successfully combining sentences. Students should then complete sentence-combining examples in pairs or groups, with the instructor circulating through the class to check for student understanding. Eventually, students work independently on sentence combining tasks to demonstrate mastery. They may then be asked to look in their own writing for examples in which they could combine sentences to improve

A listing of types and examples of sentence-combining appears below in Table 1. When creating lessons on sentence combining, instructors should review the potential types of sentence-combining in Table 1 and decide the order in which those types might be presented to their class.

Type of Sentence	Sentence Combining Example
<p>Multiple (Compound) Sentence Subjects or Objects:</p> <p>Two or more subjects can be combined with a conjunction (e.g., <i>or</i>, <i>and</i>).</p> <p>Two or more direct or indirect objects can be combined with a conjunction (e.g., <i>or</i>, <i>and</i>).</p>	<ul style="list-style-type: none"> • Skyscrapers in the city were damaged in the hurricane. <u>Bridges</u> in the city were damaged in the hurricane. <i>Skyscrapers and bridges in the city were damaged in the hurricane.</i> • When they travel, migratory birds need safe habitat. When they travel, migratory birds need <u>regular supplies of food</u>. <i>When they travel, migratory birds need safe habitat and regular supplies of food.</i>
<p>Adjectives & Adverbs: When a sentence simply contains an adjective or adverb that modifies the noun or verb of another sentence, the adjective or adverb from the first sentence can be embedded in the related sentence.</p>	<ul style="list-style-type: none"> • Dry regions are at risk for chronic water shortages. <u>Overpopulated</u> regions are at risk for chronic water shortages. <i>Dry and overpopulated regions are at risk for chronic water shortages.</i> • Health care costs have risen nationwide. Those health care costs have risen <u>quickly</u>. <i>Health care costs have risen quickly nationwide.</i>

<p>Connecting Words: One or more sentences are combined with connecting words.</p> <p>Coordinating conjunctions (e.g., <i>and, but</i>) link sentences on an equal basis.</p> <p>Subordinating conjunctions (e.g., <i>after, until, unless, before, while, because</i>) link sentences with one of the sentences subordinate or dependent on the other.</p>	<ul style="list-style-type: none"> • The house was falling apart. No one seemed to care. (but) <i>The house was falling apart, but no one seemed to care.</i> • The glaciers began to melt. The earth's average temperature increased. (because) <i>The glaciers began to melt because the earth's average temperature increased.</i>
<p>Relative Clauses: Sentence contains an embedded, subordinate clause that modifies a noun.</p>	<ul style="list-style-type: none"> • The artist was the most popular in the city. The artist painted watercolors of sunsets. (who) <i>The artist who painted watercolors of sunsets was the most popular in the city.</i>
<p>Appositives: Sentence contains two noun phrases that refer to the same object. When two sentences refer to the same noun, one sentence be reduced to an appositive and embedded in the other sentence.</p>	<ul style="list-style-type: none"> • The explorer paddled the kayak across the raging river. The explorer was <u>an expert in handling boats</u>. <i>The explorer, an expert in handling boats, paddled the kayak across the raging river.</i>
<p>Possessive Nouns: A sentence that describes possession or ownership can be reduced to a possessive noun and embedded in another sentence.</p>	<ul style="list-style-type: none"> • Some historians view the Louisiana Purchase as the most important expansion of United States territory. The Louisiana Purchase was <u>President Jefferson's</u> achievement. <i>Some historians view President Jefferson's Louisiana Purchase as the most important expansion of United States territory.</i>

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