Building Responsibility for Learning in Students with Special Needs

Ms. Alexander smiled excitedly at the beginning of her mathematics instruction. "I have a very interesting activity for you," she announced to her students. She could tell from the twenty-seven expectant fourth-grade faces in front of her that she had piqued their curiosity. On the desk beside her sat a new activity that she had brought back from the recent National Council of Teachers of Mathematics (NCTM) regional conference. The teachers participating in the session had actually solved the problem presented in the activity. After experiencing the lesson herself, she knew that it was designed to foster interaction and investigative problem solving, which was perfect for her students.

Ms. Alexander prepared a necklace for each student with a loop of string tied to a large index card. Each card had a representation of a two- or three-dimensional geometric shape. She placed a necklace on each child, with the card hanging against the child's back rather than his or her chest. This way, students could view other people's cards but did not know what was on their own.

She announced, "When I say, 'Begin,' I want you to move around the room, asking about ten of your classmates a question about your geometric shape that can be answered with either a 'yes' or 'no' response." To highlight what she expected, the teacher asked the students to give a sample question that would require only a "yes" or "no" answer. After several sample questions she continued, "After you ask a question and get the answer, jot it down on your paper, move on, and ask another person a question. Based on these questions, try to determine what shape is drawn on your necklace. Ready? Begin."

Ms. Alexander moved around the classroom to observe her class in action and to provide guidance as needed. To her dismay, however, she did not witness the kinds of behaviors she had anticipated. Jonathan began tearing around the room, bumping into other students. Ms. Alexander quickly stepped in and redirected him, but a moment later he was tugging on another student's necklace, almost choking her as he pretended to bring the card closer to his eyes to read. Ms. Alexander sent Jonathan to his seat, asking him to write three questions that he could ask other students before he moved around the room, so that the rest of the class could better focus on the activity.

Meanwhile, Eliza began telling students the shapes that were on their cards. Ms. Alexander quickly soothed the upset students, gave them new necklaces, and temporarily removed Eliza from the activity so she could speak with her.

Although no other students were as disruptive, Ms. Alexander recognized that several others were getting nowhere on the task. Lena was wildly guessing a shape to each student she approached; her strategy was to look at another student's necklace and ask if her card showed the same shape. Ms. Alexander found that Jerome was not modifying his questions as he moved from person to person; he did not seem to know how the answers he was receiving could give him clues about the shape on his back. During the NCTM conference session, Ms. Alexander had been so sure that this activity would work well, but now she was having her doubts.

What Went Wrong?

Although well intentioned, Ms. Alexander had not considered how to ensure success for her students with special needs. She had fallen into believing

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one of two common myths about teaching students with learning disabilities. The first myth is that students with special needs are vastly different from the regular school population and must be spoon-fed information or they will not be able to learn it. The second myth is that students with special needs are just like all other children in the class and "good teaching" is good teaching for all students. Both of these myths limit the success that students with learning disabilities can attain. Teachers who accept the first myth foster students who are passive learners (Poplin 1988). These students rely on an authority figure to tell them how to approach each new problem and seek the help of others to evaluate their answers to problems. They often are learning to be helpless (Seligman and Altenor 1980) and lack the confidence and analytical skills necessary for independent learning (Pressley and Harris 1990). Teachers such as Ms. Alexander who accept the second myth—that the answer lies in good teaching—fail to understand why students with special needs are referred for special status in the first place, namely, that they require different learning conditions and methods than do the majority of their peers (Kauffman 1999; Levine 1993; Thurlow 2000; Ysseldyke et al. 2001). These teachers set high expectations but do not equip their students to reach those expectations.

Although Ms. Alexander presented a meaningful problem-solving activity in which students could construct their own knowledge through inquiry and interaction with peers, she did not fully consider the following three questions:

- What organizational, behavioral, and cognitive skills are necessary for students with special needs to derive meaning from this activity?
- Which students have important weaknesses in any of these skills?
- How can I provide additional support in these areas of weakness so that students with special needs can focus on the conceptual task in the activity?

Simply put, Ms. Alexander did not consider the need to individualize her instruction.

Individualizing Instruction

Individualization of content taught and methods used with students with special needs is one of the basic tenets of special education. *Principles* *and Standards for School Mathematics* (NCTM 2000) states, "Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students" (p. 12). Calls for individualization such as this lead some teachers to abandon the philosophy of "one approach fits all" (myth number 2), only to adopt the opposite extreme (myth number 1) as their new philosophy. But if the goal is to prepare students to be autonomous learners of mathematics, teachers must find new ways to support each student while still encouraging independent learning. Students who are teacher-dependent will need help as they move to self-reliance in tackling novel mathematical situations and learning new concepts.

Teachers must consider the following four components of individualization:

- Remove specific barriers.
- Structure the environment.
- Incorporate more time and practice.
- Provide clarity.

Remove specific barriers

All students have a unique profile of relative strengths and weaknesses, including how they process different types of information. This profile is not painted in the broad strokes of subject areas, such as "strong in reading, moderate in mathematics," but in the finer detail of underlying skills (see **fig. 1**), including—

- memory (Mastropieri and Scruggs 1998; Thornton, Langrall, and Jones 1997; Wilson and Swanson 2001);
- self-regulation (Lyon and Krasnegor 1996; Swanson 1996);
- visual processing (Badian 1999; Ginsburg 1997; Rourke and Conway 1997; Thornton, Langrall, and Jones 1997);
- language processing (Cawley et al. 1998; Ginsburg 1997);
- related academic skills (Deshler, Ellis, and Lenz 1996); and
- motor skills (Miller and Mercer 1997; Rourke and Conway 1997).

Students with learning disabilities usually experience a dramatic deficit in one or more of these areas. These deficits create a roadblock between the student and the learning of skills and concepts. A teacher cannot be effective in teaching until barriers to students' learning are removed.

Barriers can be removed in several ways. Ultimately, the goal of teaching is to strengthen areas of weakness so that they no longer impede student learning. Remedial techniques are often geared to such goals. In the meantime, some types of deficits must be accommodated so that they do not impede learning in other areas. For example, Sean is a fifth grader who has particular difficulty with written expression. His teacher, Mr. Gage, noted deficits in Sean's sentence structure, along with near-phobic responses when asked to do writing activities. When asked to communicate his mathematical thinking processes through an open-ended writing prompt, Sean typically produced a near-wordless response, as **figure 2** shows.

In accordance with the NCTM Communication Standard, Mr. Gage knows that he needs to help Sean develop his ability to "communicate [his] mathematical thinking coherently and clearly to peers, teachers, and others" (NCTM 2000, p. 60). Sean's weak written-communication skills present a barrier to his full understanding of mathematical ideas. Mr. Gage must assist in removing this barrier so that Sean can focus on learning to communicate his ideas more effectively.

The day after an open-ended mathematics activity about comparing fractions, Mr. Gage met with his students one-on-one for a brief conference. When he met with Sean, however, he did not focus on Sean's written response; with a tape recorder at their side, he interviewed Sean to elicit an oral explanation of his understanding. The transcripts

Figure 1

Potential barriers for students with special needs

Memory: visual memory, verbal/auditory memory, working memory

Self-regulation: excitement/relaxation, attention, inhibition of impulses

Visual processing: visual memory, visual discrimination, visual/spatial organization, visual-motor coordination

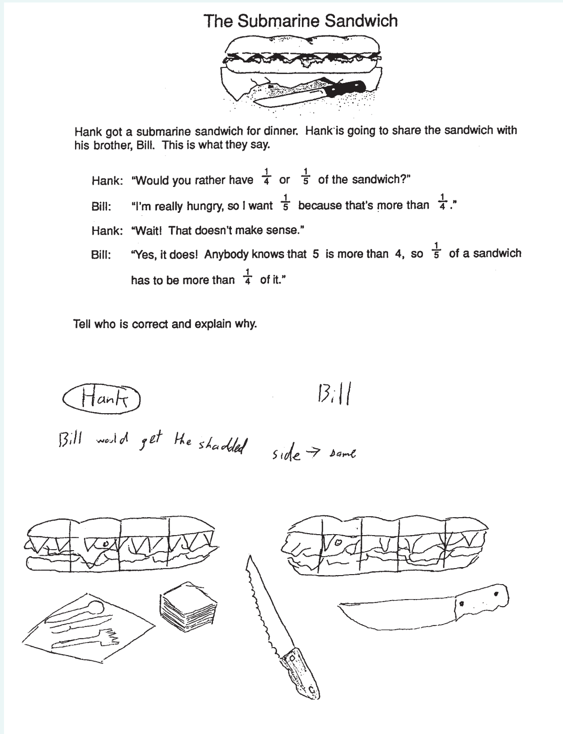
Language processing: expressive language, vocabulary development, receptive language, auditory processing

Related academic skills: reading, writing, study skills

Motor skills: writing legibly, aligning columns, working with small manipulatives, using one-to-one-correspondence, writing numerals from this recording (see **fig. 3**) demonstrate two important facts: (1) Sean did not understand his purpose or responsibility in communicating his ideas and relied on Mr. Gage's adept questioning skills; and (2) Sean actually understood the problem and related concepts better than some other students in the class. The day after the interview, Mr. Gage conferenced with Sean once again. This time, he had the typed transcript of their interview, which he treated as if it were Sean's written response. He also had colored Post-It flags, which he had used in other writing activities in the classroom. Mr. Gage helped Sean evaluate the interview by using a flag to mark the parts of the interview in which Sean demonstrated his understanding. They discussed what was so impressive about Sean's insights. Then Sean identified with different colored flags the parts of his responses that gave little or no indication of his understanding. "The next time I ask the class members to explain their answers in writing, I will interview you again," Mr. Gage explained. "Then I want you to focus on your main job, which is to demonstrate your understanding without my asking so many specific questions." By removing Sean's barrier in writing effectively, Mr. Gage helped Sean develop his communication skills and become more responsible for his own learning.

Figure 2

Sean's near-wordless response


The Submarine Sandwich

Hank got a submarine sandwich for dinner. Hank is going to share the sandwich with his brother, Bill. This is what they say.

Hank: "Would you rather have $\frac{1}{4}$ or $\frac{1}{5}$ of the sandwich?"

Bill: "I'm really hungry, so I want $\frac{1}{5}$ because that's more than $\frac{1}{4}$."

Hank: "Wait! That doesn't make sense."

Bill: "Yes, it does! Anybody knows that 5 is more than 4, so $\frac{1}{5}$ of a sandwich has to be more than $\frac{1}{4}$ of it."

Tell who is correct and explain why.

Structure the environment

To many children with learning disabilities, school is a place of competing stimuli. Written symbols are confusing; lessons seem abstract and hard to follow; directions are difficult to remember; and their own desks, backpacks, and notebooks have no organization. Their mathematics lessons, which some teachers consider "creative, stimulating, and interactive," are simply overwhelming and difficult to follow. In order to learn, such students need structure, eliminating the disorder.

To individualize instruction, then, a teacher must determine the type of structure the child needs. The teacher must consider several types of structure: information, environment, and behavior (Lerner 2003).

Often, the teacher will need to structure the information so that the students understand it. For such students, the wording of directions or the steps in presenting new concepts are important.

For many students with learning disabilities, the structure of the environment determines success or failure. These students are often easily distracted by the variety of sights and sounds in the room, so the teacher should choose the area of the classroom that presents the fewest distractions and keep visual displays purposeful rather than distractingly entertaining.

Students who are impulsive or who become easily overexcited need an environment that helps them structure their behavior. Transitions between activities must have clear directions and limited opportunities to get off-task. For these students, periods of time without clear purpose and expectations are invitations to behavioral difficulties. For example, step-by-step guidance is necessary to transition successfully from a discussion about comparing fractions to one about the use of fraction manipulatives. The teacher could say, "One person at each table should get the fraction pieces for his or her group. When you receive the fraction pieces, arrange them across the top of your desk according to size, starting with the whole at the left and moving in decreasing order to the eighths at the right. We will begin in two minutes." Limiting the number of students moving, the time to accomplish the work, and the number of requested tasks reduces the breaks in action

Figure 3

Transcripts from interview with Sean

Mr. Gage. Tell me about how you figured this out.
Sean. (re-reads the problem) Bill is stupid.
Mr. Gage. Why is Bill stupid?
Sean. Because he thought 1/5 was bigger.
Mr. Gage. Why was that stupid?
Sean. Because 1/4 is bigger than 1/5.
Mr. Gage. How do you know that?
Sean. I just know it.
Mr. Gage. If I gave you the same kind of problem with different numbers, you would know it?
Sean. Yes.
Mr. Gage. OK, I am going to share a submarine sandwich with my brother. I ask my brother if he would rather have one-seventh or one-third. If he is hungry, what would be the right answer for him to say?
Sean. One-third.
Mr. Gage. How do you know that?
Sean. Because the smaller number on the bottom is actually bigger. *(To explain, Sean discusses his drawing: two sandwiches, cut into fourths and fifths . . .)*
Mr. Gage. Can you think of a problem like this one, but with different numbers, that would be harder than this problem?
Sean. (thinks) Two-fifths and one-fourth.
Mr. Gage. Why would that be harder?
Sean. Because fifths are smaller than fourths, but there are two of those pieces now, so it would be more.
Mr. Gage. What would you do if you had that problem?
Sean. I'd draw it.
Mr. Gage. That's how you would solve it?
Sean. Mmm-hmm.
Mr. Gage. OK, show me what you would draw.
Sean. (Draws two rectangles, carefully measuring them out to be equivalent, and shades in 2/5 and 1/4. Shows that 2/5 is more than 1/4.)

that invite some students with special needs to move in less productive directions. A structured mathematics environment will still have noisy activities with animated discussions and student-led activities. The teacher, however, can plan to keep the environment structured so that the experience is meaningful and organized for students with special needs.

Incorporate more time and practice

While realizing that students with learning disabilities require more repetition in order to master concepts and skills (Carnine 1997; Miller 1996), teachers often grow uncomfortable with the notion of mindless drilling of facts and skills. The term "drill and kill" has become a popular expression of disapproval among educators (see Kohn 1998), and for good reason. Endless drilling without the initial conceptual understanding not only frustrates students but also leads to strong negative feelings about the subject area. Drill also tries to use memory as a significant learning strategy when memory is often a weak area for these students.

The key to successful practice is neither the amount of time spent on the skill in one sitting nor the use of time-pressured tests. Successful practice depends on repeated interactions with mathematics content, in small doses, throughout the day and week as the opportunity arises. Students with memory-related difficulties must continue to practice a new skill beyond the point of just achieving correct responses. The skill should be repeated periodically after some time passes to help lock information into long-term memory.

To achieve a deep learning, students with special needs require extended time per topic for adequate practice and application. This is particularly problematic when considering the number of teachers and textbooks that implement the spiral approach to instruction. The spiral approach does not often meet the needs of students with learning disabilities because topics are often covered too quickly and too much time lapses between the repeated coverage each year (Miller and Mercer 1997). Over time, fluency-building practice with concepts helps students have the facility they need to solve problems and answer mathematical questions (Johnson and Layng 1994).

Provide clarity

Undeniably, clarity is necessary for the solid learning of concepts and skills by all students. This is a particularly significant issue for teachers of students with learning disabilities. As demonstrated in reading instruction, methods that rely heavily on constructivist approaches are sometimes not as effective for the learning-disabled population as are approaches that focus on more explicit instruction (Torgesen 1998). The desire to provide clarity can lead us to overcompensating for students who are struggling, however, and never challenging them to take risks and grapple with the unknown.

Depending on the mathematics content and the student, a mathematics teacher may use direct modeling of a new task, guide the student's thought processes through the use of open-ended questions, or provide insight when necessary after a period of student-led inquiry. No one approach fits all students. The goal is for the teacher to ensure clarity of understanding, giving students multiple opportunities for practice and application.

The need for clarity in instruction can be seen with Paquin, a fourth grader in Ms. Boone's mathematics class. Ms. Boone gave her students a story problem related to a school's upcoming "Spring Fling," for which students were selling raffle tickets. The problem was a released item from the Ohio Proficiency test. Ms. Boone saw the problem as a way to reinforce evaluation and editing skills, which were troubling several of her students. Paquin's response was rather perplexing to her; a strange scribbled image on his sheet showed that he did not know how to approach the problem (see **fig. 4**). Upon reflection, however, Paquin's response made sense. Paquin often seemed overwhelmed by a new task, especially one that contained multiple steps and had no clear beginning. This characteristic is quite common among students with learning disabilities or other learning differences, such as ADHD, for which difficulty in organizing tasks is a diagnostic criterion (American Psychiatric Association 2000).

Ms. Boone began to plan a follow-up activity. How could she help students discover where to begin without taking responsibility for the thinking away from them? The next day she presented the Spring Fling problem again. This time, however, she began with a clarifying activity. "Look at the mathematics that was a part of solving this problem," she said. "What kinds of mistakes do people sometimes make when they do this kind of work?" She wrote the students' responses on a large sheet of paper (see **fig. 5**). When the students finished brainstorming, she left their list of ideas in full view and asked them to edit the problems. This time, all her students were more successful in correcting multiple errors hidden in the problem. Paquin's revised response (see **fig. 6**), although not completely successful, showed that he could now approach the task without being overwhelmed.

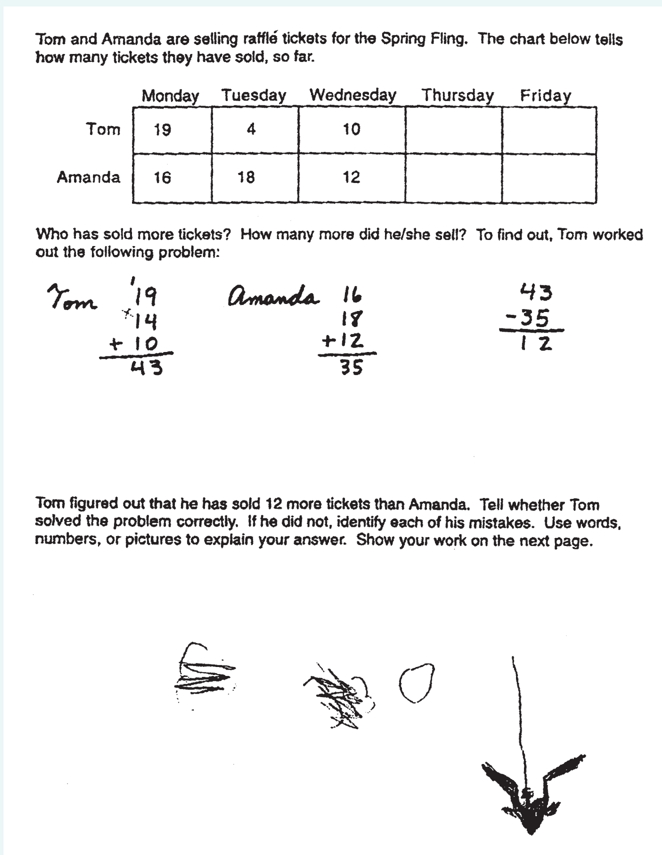
Revising the Necklace Activity

In light of these four fundamental components of individualization, let us look back at Ms. Alexander's geometry necklace activity. Not to be defeated, this courageous teacher repeated the activity again several days later, after considering particular students' strengths and weaknesses. She considered the following issues: How could she modify this activity in order for her students to better focus and gain from the learning experience? What barriers could she remove?

Ms. Alexander revisited what she observed during the initial experience with the lesson and decided on several changes. She noticed that Jerome previously had trouble making cause-and-effect connections—that is, seeing the relationships between ideas. In fact, he frequently had difficulty solving open-ended problems. Some support at the beginning of the task would help give Jerome the clarity to work on his own. When she repeated the activity, Ms. Alexander decided to start the lesson by asking all the students for specific examples of a good geometry-based question and a not-so-good question. Then they discussed how each leads to either helpful information or a dead end. She listed a few helpful questions on an overhead, then wrote "yes" or "no" under each question. Students talked about what shapes this

Figure 4

Paquin's scribbled response


Tom and Amanda are selling raffle tickets for the Spring Fling. The chart below tells how many tickets they have sold, so far.

	Monday	Tuesday	Wednesday	Thursday	Friday
Tom	19	4	10		
Amanda	16	18	12		

Who has sold more tickets? How many more did he/she sell? To find out, Tom worked out the following problem:

Tom 19 + 14 + 10 = 43; Amanda 16 + 18 + 12 = 35; 43 − 35 = 12

Tom figured out that he has sold 12 more tickets than Amanda. Tell whether Tom solved the problem correctly. If he did not, identify each of his mistakes. Use words, numbers, or pictures to explain your answer. Show your work on the next page.

Figure 5

List of student mistakes

- Copying things incorrectly from the chart
- Reading the chart the wrong way (vertically instead of horizontally)
- Reading or writing the numbers wrong (25 instead of 52)
- Adding and not regrouping correctly
- Subtracting up instead of down
- Not regrouping

set of answers eliminated and why. Ms. Alexander then changed the answers to each question, and the students talked about how the change altered the next question. She began the necklace activity. This clarification was very productive for a student such as Jerome, who often seemed not to know where to begin when confronted with an open-ended task. Although it provided the clarity necessary for him to approach the problem, it left the actual problem-solving task in his own hands.

Lena seemed to face several barriers. First, during the original activity, the purpose of the activity was unclear to her. She did not understand that the goal of the activity was to do detective work, asking important questions and gathering clues to solve a mystery instead of just randomly guessing a shape. Identifying her barriers and structuring the environment helped provide this clarity, but Ms. Alexander believed that Lena needed additional support to begin the activity. She helped Lena decide on her first question to ask a student, then asked Lena to explain what clues an answer to the question gave her. From her response, Ms. Alexander saw that Lena needed explicit help in narrowing the task to questions that emphasized particular characteristics of the shapes. Ms. Alexander continued to serve as Lena's "sounding board" throughout the activity, having Lena voice her thoughts clearly in order to decide on the next steps. Ms. Alexander was careful not to tell Lena what to do at any stage, but required her to communicate clearly. She asked Lena open-ended questions when Lena seemed to be at a roadblock. An additional roadblock existed, as well: In several previous activities, Lena demonstrated some difficulty in visualizing shapes and representations. Upon reflection, Ms. Alexander realized that such a deficit could explain Lena's random guessing. For this activity, then, Ms. Alexander provided a sheet of paper that showed all possible two- and three-dimensional shapes that could be on the necklaces. Lena carried this paper around so that as she asked questions, she could cross off shapes that did not fit the answers she received to her questions.

Jonathan and Eliza both needed structure and a limiting of options. They were too easily overstimulated by loosely structured activities, but in different ways. Jonathan, who bumped into others, had difficulty controlling his physical excitement level, whereas Eliza, who told students their secret shape, was verbally impulsive. They needed clearer boundaries and specific expectations. Ms. Alexander devised more explicit directions, getting them to think ahead and remain calm. She thought that the clarification also helped them both by showing them how to approach the task and narrow possibilities. She gave Jonathan a sheet of illustrations, just as she did for Lena, but for a different purpose. Lena had difficulty picturing the shapes in her head, whereas Jonathan needed a hands-on tool to organize his approach and to keep his hands busy. Finally, to help Eliza, Ms. Alexander pulled her aside and privately asked her to describe what types of talking were appropriate for the activity. This served as one more clarifying moment to help ward off impulsive actions.

Ms. Alexander also decided to change the shape representations on each card for the second trial. In place of a single illustration, she drew several examples and orientations of the shape on each necklace. This change provided clarity for all students and practice and repeated interaction with the geometric concepts. Ms. Alexander saw this as a way to prevent overgeneralizations and expand thinking during the task.

The teacher learned to provide the four fundamental components of individualization that her students needed without reducing the learning expectations placed on them. The important issue was to remove specific barriers between the student and the learning task while still challenging each student to take risks and to have responsibility for his or her own learning. At times, this support can be very teacher-directed, involving modeling and immediate feedback. At other times, it can involve more subtle interventions from the teacher. As a teacher becomes more in tune with her students and their needs, she will become more successful in planning an activity adequately the first time and in learning from her successes.

Ms. Alexander found that confusion could result from not thinking about how to structure the environment, how to anticipate barriers that students might encounter (such as visualization difficulties or impulsivity), and how to ensure clarity so that students truly understood the task.

Conclusion

At a time when the No Child Left Behind Act has led to a nationwide movement toward more rigorous mathematics coursework to achieve a high school diploma, knowing how to successfully teach students with special needs is essential. Given the diversity of the ability levels in most inclusive classrooms, a continuum of responsibility for learning, from high teacher responsibility to high student responsibility, is useful in thinking about instruction. Selecting the pedagogical strategies that require the most student responsibility for learning is the constant goal of the teacher. Often, though, other characteristics of the students with special needs prevent the consistent use of more student-centered approaches. Therefore, a number of important elements must be considered as strategies are integrated in the development of instruction. Teachers must make decisions about the characteristics of the learner, the task, and the setting. As teachers assess students through intensive observation, they also can take into account the need for identifying and removing barriers, structuring the environment, incorporating more time and practice, and providing clarity so that they can adjust their approach for all students, particularly those with special needs.

References

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders.* 4th ed. Washington, D.C.: American Psychiatric Association, 2000.

Badian, Nathalie. "Persistent Arithmetic, Reading or Arithmetic and Reading Disability." *Annuals of Dyslexia* 49 (1999): 45–70.

Carnine, Douglas. "Instructional Design in Mathematics for Students with Learning Disabilities." *Journal of Learning Disabilities* 30 (2) (1997): 134–41.

Cawley, John, Rene Parmar, Wenfan Yan, and James Miller. "Arithmetic Computation Performance of Students with Learning Disabilities: Implications for Curriculum." *Learning Disabilities Research and Practice* 13 (2) (1998): 68–74.

Deshler, Donald, Edwin S. Ellis, and B. Keith Lenz. *Teaching Adolescents with Learning Disabilities: Strategies and Methods*. Denver, Co.: Love Publishing, 1996.

Ginsburg, Herbert. "Mathematics Learning Disabilities: A View from Developmental Psychology." *Journal of Learning Disabilities* 30 (1) (1997): 20–33.

Johnson, Kent R., and Terrence V. Layng. "The Morningside Model of Generative Instruction." In *Behavior Analysis in Education: Focus on Measurably Superior Instruction,* edited by Ralph Gardner, Diane Sainato, John Cooper, Timothy Heron, William Heward, John Eshleman, and Teresa Grossi, pp. 173–97. Monterey, Calif.: Brooks/Cole, 1994.

Kauffman, James M. "How We Prevent the Prevention of Emotional and Behavioral Disorders." *Exceptional Children* 65 (4) (1999): 448–68.

Kohn, Alfie. *What to Look for in a Classroom*. San Francisco: Jossey-Bass, 1998.

Lerner, Janet. *Learning Disabilities: Theories, Diagnosis, and Teaching Strategies*. Boston: Houghton Mifflin, 2003.

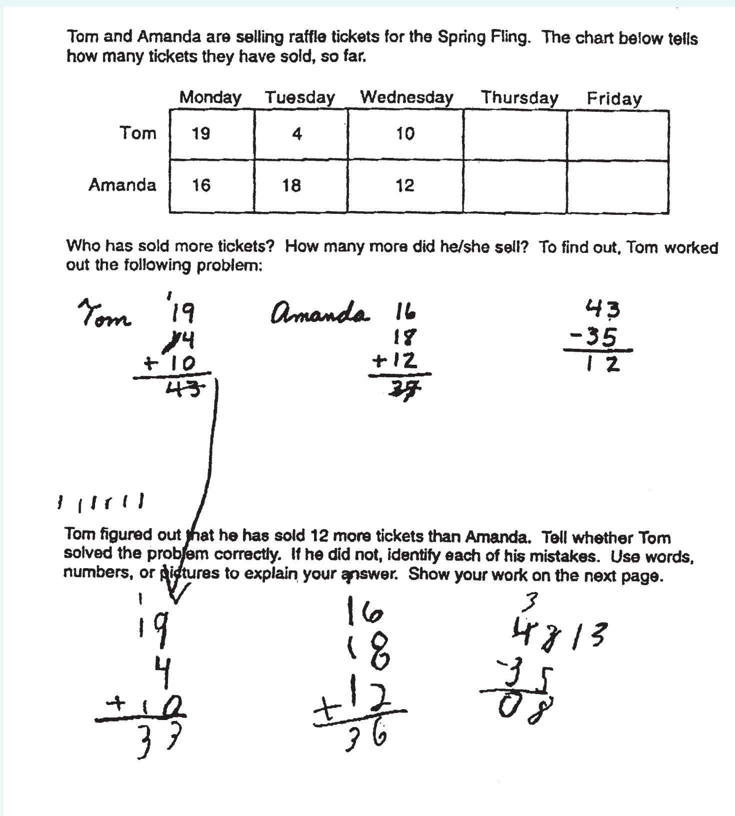
Levine, Mel. *All Kinds of Minds*. Cambridge, Mass.: Educator's Publishing Service, 1993.

Lyon, G. Reid, and Norman Krasnegor, eds. *Attention, Memory, and Executive Function*. Baltimore: Paul H. Brookes, 1996.

Mastropieri, Margo, and Thomas Scruggs. "Constructing More Meaningful Relationships in the Classroom:

Figure 6

Paquin's revised response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Mnemonic Research into Practice." *Learning Disabilities Research & Practice* 13 (3) (1998): 138–45.
Miller, Susan P. "Perspectives on Mathematics Instruction." In *Teaching Adolescents with Learning Disabilities,* edited by Donald Deshler, Edwin Ellis, and B. Keith Lenz, pp. 313–68. Denver, Co.: Love Publishing, 1996.
Miller, Susan P., and Cecil D. Mercer. "Educational Aspects of Mathematics Disabilities." *Journal of Learning Disabilities* 30 (1) (1997): 47–56.
National Council of Teachers of Mathematics (NCTM). *Principles and Standards for School Mathematics.* Reston, Va.: NCTM, 2000.
Poplin, Mary S. "The Reductionistic Fallacy in Learning Disabilities: Replicating the Past by Reducing the Present." *Journal of Learning Disabilities* 21 (1988): 389–400.
Pressley, Michael, and Karen R. Harris. "What We Really Know about Strategy Instruction." *Educational Leadership* 48 (1) (1990): 31–34.
Rourke, Byron, and James Conway. "Disabilities of Arithmetic and Mathematical Reasoning: Perspectives from Neurology and Neuropsychology." *Journal of Learning Disabilities* 30 (1) (1997): 34–46.
Seligman, Martin E., and Aidan Altenor. "Coping Behavior: Learned Helplessness, Psychological Change, and Learned Inactivity." *Behaviour Research and Therapy* 18 (1980): 459–512.
Swanson, H. Lee. "Informational Processing: An Introduction." In *Cognitive Approaches to Learning Disabilities,* edited by D. Kim Reid, Wayne Hresko, and H. Lee Swanson, pp. 251–86. Austin, Texas: Pro-Ed, 1996.
Thorton, Carol, Cynthia Langrall, and Graham Jones. "Mathematics Instruction for Elementary Students with Learning Disabilities." *Journal of Learning Disabilities* 30 (2) (1997): 142–50.
Thurlow, Martha. "Standards-Based Reform and Students with Disabilities: Reflections on a Decade of Change." *Focus on Exceptional Children* 33 (3) (2000): 1–16.
Torgesen, Joseph K. "Assessment and Instruction for Phonemic Awareness and Word Recognition Skills." In *Language and Reading Disabilities,* edited by Hugh W. Catts and Alan G. Kamhi, pp. 128–53. Needham Heights, Mass.: Allyn & Bacon, 1998.
Wilson, Kathleen, and H. Lee Swanson. "Are Mathematics Disabilities Due to a Domain-General or a Domain-Specific Working Memory Deficit?" *Journal of Learning Disabilities* 34 (3) (2001): 237–48.
Ysseldyke, Jim, Martha Thurlow, John Bielinski, Allison House, Mark Moody, and John Haigh. "The Relationship between Instructional and Assessment Accommodations in an Inclusive State Accountability System." *Journal of Learning Disabilities* 34 (3) (2001): 212–20. ▲