Teacher’s Guide to
Accelerated Math for Intervention™
Accelerated Math for Intervention is a highly effective, research-based math intervention program for grades 3 through 12 that allows you to identify and address gaps in critical skills, provide targeted instruction with differentiated practice, increase student engagement and motivation, and use formative assessments to generate actionable data for yourself and your students. The program harnesses the power of Accelerated Math, MathFacts in a Flash, and STAR Math software, all of which have had proven success in tens of thousands of schools for over a decade. Of course, the results that you and your students achieve with Accelerated Math for Intervention will depend on how you implement it. That’s why the program also includes comprehensive professional development training and resources to help you build a dynamic environment for learning that meets the needs of all your students.

This book is one of the resources intended to guide you as you implement the program. We hope that you find it informative and inspiring.
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Chapter 1
Program Overview
Henry is a student who is struggling with math. He started falling behind years ago. Because his family moved around a lot, he transferred in and out of various school districts. He didn’t have enough time to practice math facts or learn core concepts before his class moved on to the next lesson. As time went on, the gaps in his knowledge accumulated, causing him to fall further and further behind. Henry is now in the eighth grade, yet concepts he should have learned in the fourth grade are still not part of his knowledge base. Since he lacks automaticity with basic math facts, he has to struggle to derive simple addition or multiplication facts when trying to work more complex problems. As a result, he is frustrated and unmotivated. It doesn’t seem worth it to him to pay attention in math class or put forth any effort. Unless a successful intervention can help him, he will keep struggling and may never gain proficiency or reach grade-level goals.

Henry is like millions of kids across the United States. Currently, less than 40 percent of U.S. students are proficient in math by fourth grade, less than 35 percent are proficient by eighth grade, and only 23 percent are proficient by twelfth grade. Fortunately, there is a solution. Accelerated Math for Intervention is a cohesive system designed for grades 3 through 12 that addresses the three things struggling students need most: It targets automaticity with basic math facts, builds mastery of critical mathematical skills, and leads to a sense of engagement and self-efficacy with math.

When Henry enrolls in an Accelerated Math for Intervention class, the first thing that his teacher, Ms. Garcia, does is to find Henry’s “edge”—the boundaries of what he knows and what he’s ready to learn. She does this with the help of a couple of key software tools. First, she gives him the STAR Math assessment, which recommends placing Henry in the fourth- or fifth-grade library of objectives in Accelerated Math. In order to allow Henry to experience success with math, Ms. Garcia starts him in the lower of the two, the fourth-grade Accelerated Math library. Henry aces his first diagnostic test. He moves ahead and aces the next test, and the next one, and the one after that. When he brings his fourth 100-percent score to Ms. Garcia, he is suppressing a smile. “Can I bring this home to show my parents?” he asks. “Of course,” she says. Henry is proud of his work in math for the first time he can remember.

Eventually, Henry reaches a concept that stumps him. He gets a score of 40 percent. Now Ms. Garcia knows she’s found Henry’s edge. As she identifies the gaps in his knowledge, she is able to target her instruction so that it addresses exactly what Henry needs. Because Ms. Garcia’s class is fully differentiated, the core instruction happens in one-on-one teacher-student conferences, where she reteaches concepts, uses manipulatives and visual representations, encourages
students to make their thinking visible, and provides explicit instruction. Meanwhile, Henry engages in personalized practice using Accelerated Math and practices the math facts he needs to gain computational fluency using MathFacts in a Flash. He uses a handheld tool called a Renaissance Responder to score assignments and practice math facts at his desk with real-time feedback. Henry also rotates through several learning stations, which provide additional reinforcement of mathematical concepts and number sense development. Finally, there are resources and reference materials all around the room for Henry to use while he waits for his turn with Ms. Garcia, so no academic engaged time is wasted.

**Teacher Tasks in Accelerated Math for Intervention**

With Accelerated Math for Intervention, Henry is experiencing success, yet also being challenged. He is mastering objectives in a steady course of progress. He is able to work independently and get help when he needs it. Because of regular STAR Math assessments, Ms. Garcia and Henry are able to chart and monitor his progress as he approaches his goal of working at grade-level. Henry feels empowered, motivated, and engaged.

The beauty of Accelerated Math for Intervention is that it works not just for Henry, but for every one of his classmates—at the same time—even though they are all working at varying levels and paces. In fact, Henry sits near a classmate named Jasmine who is working on fifth-grade objectives. Henry and Jasmine share resources, help each other with classroom procedures, and practice math facts together.
Here’s how the class looks in a top-down view:

There are many parts to Accelerated Math for Intervention, but once they all come together, the classroom is like an intricate symphony with Ms. Garcia as the conductor. The sophisticated software and hardware help make full differentiation possible, and the routines Ms. Garcia has set up allow her to maintain a smooth flow of classroom activities.
This teacher’s guide is a companion piece to the essential professional development that supports your implementation every step of the way. Here’s how this guide is structured: In this chapter, we provide an overview of the program. In Chapter 2, we turn to the planning tasks you’ll need to do before getting started with the program. These include the software and hardware components as well as some of the classroom routines you’ll need to put into place. At the end of Chapter 2, you’ll find a checklist to help guide you through these planning tasks as well as a suggestion for one way to get started—using a “practice run” to help teach your students the classroom routines. In Chapter 3, we give step-by-step guidelines for getting started with the program.

In Chapter 4, we cover ongoing monitoring, explaining how teachers can use data on a regular basis to make quick and effective judgments about how students are doing and to monitor goals. In Chapter 5, we cover instructional strategies and tools. In Chapter 6, we give guidelines for measuring the success of your implementation. Finally, in Chapter 7, we answer some common questions to provide troubleshooting advice.

In the appendix, you’ll find instructions for how to perform common software tasks, a list of MathFacts in a Flash levels, sample reports, and several reproducible forms. For a thorough explanation of the research behind the program, see the white paper entitled “The Research Foundation of Accelerated Math for Intervention,” which is located after the appendix.

Another important resource included in your Accelerated Math for Intervention materials is the Numeracy Development and Intervention Guide, published separately from this teacher’s guide and written by Dr. Kenneth E. Vos, an expert in mathematics education.
**Key Tools of Accelerated Math for Intervention**

**STAR Math** is a computer-adaptive assessment designed to give accurate, reliable, and valid data about students' math ability quickly so that teachers can make good decisions about instruction and intervention. It also includes a sophisticated goal-setting tool to allow teachers to monitor each student's growth rate against a personalized goal. For more information, see the product overview on p. 20.

**Accelerated Math** is a software program that generates (1) diagnostic tests to help determine students' base of knowledge, (2) personalized practice assignments based on student performance, (3) exercises to provide extra practice on specific objectives, and (4) regular tests that measure which objectives students have mastered. The program provides results immediately and allows for full differentiation in the classroom. A TOPS Report prints with the results any time a student scores work. For more information, see the product overview on p. 30.

**MathFacts in a Flash** is a software program designed to give students valuable practice with addition, subtraction, multiplication, and division facts, as well as other math skills, including finding squares and converting between fractions, decimals, and percentages. Most important, the software assesses mastery of math facts with automaticity. The program gives immediate corrective feedback for each problem missed and enables customizable time goals for test sessions. For more information, see the product overview on p. 24.

**Renaissance Responders** are handheld tools students use to score Accelerated Math assignments and practice math facts. Responders wirelessly send data to a Renaissance Receiver, which communicates with software on the teacher's computer. Renaissance Responders are part of the 2Know! classroom response system. They can also be used as formative assessment tools during group instruction and practice.

**Renaissance Home Connect** provides parents with a snapshot of their child's progress in Accelerated Math, including average percent correct on tests, number of math objectives mastered, and results on the last test. It also provides students with extra practice with MathFacts in a Flash outside of the classroom. Renaissance Home Connect is accessible through the Internet with a user name and password.

**Professional Development**, in the form of this teacher's guide, on-site training, ongoing coaching, and on-demand sessions, provides continual support for your implementation of Accelerated Math for Intervention. It includes suggestions about how to use the program in your school, guidance about classroom management, suggestions for instructional strategies and tools, assistance with your software implementation, and help interpreting data all year long.
The Big Picture

The illustration below shows how Accelerated Math for Intervention meets the needs of students who have difficulty with math:

**What Struggling Math Students Need Most**
- Automaticity with basic math facts
- Mastery of critical mathematical skills
- Motivation and self-efficacy

**Differentiated Instruction**
- STAR Math software helps determine each student’s starting point.
- Accelerated Math software helps teachers pinpoint gaps in students’ knowledge.
- One-on-one conferences allow teachers to provide targeted instruction.
- STAR Math software allows individual goal setting and progress monitoring.

**Personalized Practice**
- Accelerated Math software provides structured practice at the student’s level.
- MathFacts in a Flash on classroom computers and Renaissance Responders provides practice with real-time feedback.
- Renaissance Home Connect gets parents involved and extends practice outside of school.

**Empowerment**
- Students experience success in math.
- Students receive immediate feedback on performance.
- Students take control of their own learning by working independently and getting help when they need it.
- Students track their own progress.

MathFacts in a Flash and Accelerated Math assess mastery and STAR Math measures growth.
Chapter 2
Planning and Beginning Tasks

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Planning and Beginning Tasks

You always need to start with a plan. For example, let’s say you’re excited to tackle a new recipe. You roll up your sleeves, crack open the cookbook, and stare at the page. The picture of the food makes your mouth water. But then you see the list of ingredients—it looks long. And the directions cover three pages. Let the filling sit overnight? Use day-old bread? Preheating? Suddenly your anticipation turns into anxiety. You begin to wonder if this was such a good idea after all. But the picture of the food catches your eye again and it looks too good to pass up. So you take a deep breath, read through the directions, and decide, with a little patience and planning, you can do it.

Think of your implementation of Accelerated Math for Intervention as a complex, yet tantalizing, recipe. It consists of many pieces that come together over time to provide a rewarding experience for you and your students. Of course, as with the recipe, you have to start with a plan. You need to determine a course of action and do just enough “chef prep” so that things go smoothly. In this chapter, we’ll help you with this endeavor by describing essential preparation tasks—related to classroom management, the software, and the hardware—necessary for implementing Accelerated Math for Intervention. We begin with an overview of the tasks, and then look at each one in more detail. We also include a checklist that summarizes the key steps you’ll take during this planning phase. At the end of the chapter, we describe a “practice run” as one way to transition from the planning phase to implementing Accelerated Math for Intervention in your classroom.

Overview of Preparation Tasks

There are many ways to begin with Accelerated Math for Intervention, but a few preparation tasks are essential to every implementation:

• **Become familiar with the components of Accelerated Math for Intervention.**
  If Accelerated Math for Intervention is a recipe, then the software and hardware components are your main ingredients. The software components include STAR Math, MathFacts in a Flash, and Accelerated Math. You’ll access these programs through the Web-based Renaissance Place Real Time platform using any computer with an Internet connection. Students will also log into Renaissance Place to perform some tasks in Accelerated Math for Intervention, like taking STAR Math tests, but will work outside of Renaissance Place for other activities, like completing Accelerated Math assignments. On the hardware side, you’ll use the Renaissance Receiver and your students will use Renaissance Responders, both part of the 2Know! classroom response system.

• **Decide how to manage your classroom.** Classroom management is the “sauce” of the recipe: it brings all the ingredients together. Establishing routines, setting up your classroom to mitigate down time and heavy traffic, and being
clear and consistent when enforcing classroom rules—these considerations are essential to every implementation of Accelerated Math for Intervention. They keep things in motion and maximize engaged time. Of course, routines and rules are necessary in every classroom, but they become critical in a fully differentiated intervention setting. Students need to work independently—so you have plenty of opportunities for one-on-one instruction and reteaching—and they need to be meaningfully engaged while working independently so they don’t fall further behind. Thoughtful classroom management makes this possible.

- **Establish a baseline for measuring overall growth.** Accelerated Math for Intervention includes many tools for measuring growth. Accelerated Math and MathFacts in a Flash provide information about student learning on a daily basis, and STAR Math helps measure growth in overall math ability over time. For measuring growth over time, you first need to establish a starting point for students. You’ll do this by administering a STAR Math test at the beginning of your implementation. Then, in the weeks or months that follow, you’ll continue to periodically administer STAR Math to your students so you, and they, can see their amount of growth in overall math ability.

- **Consider how students will develop fact fluency.** All students need to develop or maintain fact fluency, regardless of grade or skill level. Accelerated Math for Intervention includes several tools to help students do this: MathFacts in a Flash provides students with effective math fact practice with the goal of automaticity, i.e., knowing math facts without having to think about them; Renaissance Responders enable lots of independent math fact practice with immediate feedback; flash cards and math fact worksheets provide additional means of self-directed practice; learning stations expose students to foundational concepts and strategies that lead to fact fluency; and the Numeracy Development and Intervention Guide provides guidance for supporting students every step of the way. So, with all of these tools in your bag, which one should you pull out first? Ultimately, that’s up to you. You might choose to utilize all tools at the outset, especially if you’re focusing on establishing comprehensive routines or are already familiar with one or more of the components of Accelerated Math for Intervention. Or, you might decide to keep it simple at the start: have students practice math facts on Renaissance Responders. We’ll discuss this simple approach later in this chapter, and will consider other tools for developing fact fluency throughout the rest of the guide.

- **Prepare for students to work on critical skills.** Classroom management might be the sauce, but critical skills work is the protein—the “meat” of the implementation. Students receive intervention because they’re behind in their math skills, often by several grade levels. They need to strengthen the foundation of their learning before they can add on more layers. That’s the process you’ll get underway: helping students address conceptual and procedural gaps by building their base of knowledge so that they’re ready for new, perhaps grade-level, material. With the help of Accelerated Math, fully differentiated, guided practice is possible. Students work problems at their own level, score them, receive immediate feedback, pick up another assignment, and possibly sign up to meet with you. You’ll set up a system to help monitor
with whom you need to meet and why. At the outset, you might decide to use a scaled-down approach: having all students work with the same small set of Accelerated Math objectives. In the following days or weeks, you can shift to fully differentiated practice. We describe the scaled-down approach in the practice run section at the end of this chapter; the next chapter discusses using Accelerated Math to support fully differentiated practice.

Become Familiar with the Components of Accelerated Math for Intervention

As we mentioned earlier, Accelerated Math for Intervention includes both software and hardware components. During the planning phase, spend some time setting up and getting acquainted with these components. The practice run, described at the end of the chapter, offers suggestions for how to introduce your students to the software and hardware once you’re ready to launch your implementation.

On the software side of Accelerated Math for Intervention, you’ll primarily use three programs: STAR Math (for monitoring growth in overall math ability), MathFacts in a Flash (for helping students develop automaticity with math facts), and Accelerated Math (for critical skills work). You’ll access these programs by logging into Renaissance Place with a unique user name and password. (Contact your technology administrator if you need your Renaissance Place address or your user name and password.) From Renaissance Place, you can manage student work, generate reports, and set preferences for STAR Math, MathFacts in a Flash, and Accelerated Math. Your students will log into Renaissance Place to take STAR Math tests and to master levels in MathFacts in a Flash; they’ll complete all of their Accelerated Math work with paper and pencil. For more information about how the software components work, please see the product overviews for STAR Math (p. 20), MathFacts in a Flash (p. 24), and Accelerated Math (p. 30).

Renaissance Place also provides access to manuals and other resources to support your implementation of Accelerated Math for Intervention. After you log into Renaissance Place, click Manuals in the upper right corner of any page to find a number of manuals and resources, including those referred to in this guide:

<table>
<thead>
<tr>
<th>Component</th>
<th>Manuals Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerated Math</td>
<td>• Software Manual</td>
</tr>
<tr>
<td></td>
<td>• 2Know! Classroom Response System Setup and Resource Guide</td>
</tr>
<tr>
<td>MathFacts in a Flash</td>
<td>• Software Manual</td>
</tr>
<tr>
<td>STAR Math</td>
<td>• Pretest Instructions</td>
</tr>
<tr>
<td></td>
<td>• Software Manual</td>
</tr>
<tr>
<td></td>
<td>• Technical Manual</td>
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Tips and manuals are also available in the resource sections of STAR Math, MathFacts in a Flash, and Accelerated Math. For questions during regular business hours, use the Renaissance Place link for “Live Chat Support.” Or, click the Help link in the upper right corner of every Renaissance Place page to access additional information about the page you’re viewing as well as a search feature and an index.
The hardware side of Accelerated Math for Intervention is comprised of the Renaissance Receiver (used by you) and the Renaissance Responders (used by your students). You’ll connect the Renaissance Receiver to your computer via a USB port so students can send information to programs like Accelerated Math and MathFacts in a Flash using the handheld Renaissance Responders. When you connect your Renaissance Receiver, you’ll need to perform a few setup tasks, e.g., setting a Receiver name and entering your Renaissance Place address. You’ll do these tasks in the Renaissance Wireless Server Utility program which, once installed, automatically runs in the background when you start your computer. The utility program is necessary for activities like scoring Accelerated Math assignments, which we’ll discuss later in this chapter. To learn how to install the Renaissance Wireless Server Utility and set up your Renaissance Receiver, please see the 2Know! Classroom Response System Setup and Resource Guide, found under Accelerated Math on the Manuals page in Renaissance Place.
Decide How to Manage Your Classroom

Utilizing a system of routines and attending to classroom setup can create the structured environment necessary for Accelerated Math for Intervention to reach its fullest potential. You'll need to build in opportunities for skills work and fact fluency development—both of which are important for success in math. One way to do this is to create several learning stations or activities in your classroom and to have students rotate through these different activities (on a weekly basis, for example) in order to build competency in both areas. The bulk of your class time—generally, the middle portion of the period—should be built around these learning stations and activities, with the core focus on students developing mastery of critical skills. You can also use 10 to 15 minutes at the beginning and five or so minutes at the end of class for additional whole-class fact fluency and number sense activities.

Accelerated Math software is the key tool you’ll use for the work on critical skills development. Accelerated Math allows for fully differentiated instruction, so the students assigned to this activity will require the biggest portion of your attention. Because you’ll be meeting with these students in one-on-one conferences, you may wish to have 10 or fewer students work in Accelerated Math per class period. If you have more than 10 students in your class, that’s where the other learning stations come in. They allow some students to work independently and others to be monitored by aides, freeing up the bulk of your attention for those using Accelerated Math. All students get the chance to work in Accelerated Math; they just rotate through according to a pre-set schedule. On the other hand, if you only have 10 or fewer students in your class, you may not need a rotation system. Instead, students may transition from one kind of work to another at the same time.

Other Models

The Accelerated Math for Intervention model presented in this guide assumes that the intervention class is in addition to core instruction and that students are likely to be at different levels. In this model, there is no set scope and sequence; instead, instruction is driven by the gaps in each student’s knowledge. However, if your school follows a different model, Accelerated Math for Intervention can still work for you. For instance, some high schools may offer math intervention as a replacement class that follows a defined scope and sequence. This model may necessitate the use of small- and whole-group instruction as opposed to the fully differentiated instruction described in this guide. If your school uses one of these alternate models, you can work with your coach or consultant on tailoring the program to best meet your needs. In addition, you may find Getting Results with Accelerated Math to be a helpful reference since it reflects best practices for a wide range of models. This publication is available as a free download or for purchase as a spiral-bound copy through our Web site, www.renlearn.com.
The visual on the opposite page shows what an Accelerated Math for Intervention class with 15 students might look like during the middle portion of class. Nine students work on critical skills development: One student is receiving differentiated instruction in a conference with the teacher, six are working at their desks on personalized practice assignments, one has just scored an assignment and is picking up a report at the printer to see how he did, and one student is waiting to show the teacher his work before scoring. The remaining six students practice fact fluency at computers or work at one of two learning stations. An aide monitors one of the learning stations, while students work independently at the computers and at the other learning station. During this time period, class is likely to resemble a quiet tutoring center more than a whole-group, teacher-led class.

Keep in mind that this visual only captures the classroom at one moment in time. If you observed the entire class period, you would see the teacher leading the whole class in a fact fluency or number sense activity during the first 10 to 15 minutes of class. Then, during the middle portion of class, you would see students working at the learning station or activity to which they are assigned for that week. Finally, when five or so minutes are left at the end of class, you would see the students putting their materials away and the teacher bringing the whole class together again for a wrap-up activity.

Because there are so many things going on at once in Accelerated Math for Intervention, it’s essential to think carefully about how best to manage your classroom. The class described above represents just one way you might structure things, but another way might work better for you depending on the resources you have at your disposal, the number of students in your class, or the particular circumstances of your school. Since every class is different, your class won’t look exactly like the model on the opposite page. What’s important to notice in the model is that several kinds of activities take place in the classroom and the classroom is set up to support them.

Below is a checklist with questions to help you think about the best way to approach your own classroom management. You may not be able to decide all of these things until you’ve learned a little more about how the software works, but you can begin to think about them now and come back to refine your routines when you are ready. Ultimately, the goal is to develop a clear picture in your mind of the student behaviors you want to see during your class, which will make it easier to communicate those expectations to your students.

- **Envision the activities you want to have happen in the classroom.**
  - *What kinds of core activities will you use to support critical skills work and fact fluency development?* Both of these areas are essential for success in math. Think about the different activities you’ll include for students to build competency in both areas.
  - *What resources do you have available, in addition to the software, hardware, and printed materials that come with the program?* Examples include computers, instructional aides, community volunteers, student aides,
Planning and Beginning Tasks

- Student folders
- Print report and next assignment
- Handheld classroom responders
- Differentiated Instruction
- Math Fact Fluency and Assessment
- Personalized Math Practice
- Learning Station 1: Jason & Maria
- Learning Station 2: Darryl & Megan
- Computers: Sam & Javier

Posted Schedule

- Bulletin board
- Book shelves/storage bins

Student
Teacher's Aide
Teacher
manipulatives, and number sense activities built around dominos, number cubes, or cards.

• Which activities require monitoring by you or an aide? Which ones can run independently? For instance, some students may be able to work independently on fact fluency on computers or with flash cards. Meanwhile, an aide could run a number sense learning station. This frees you up to focus mainly on the students working on critical skills development. If you don’t have an aide to help out, focus on identifying what students can do independently, with just enough structure or support.

• How will you structure each class period? As in the model described earlier, a 50-minute class period could start with 15 minutes of fact fluency work, followed by 30 minutes of critical skills or learning station time, and end with five minutes of wrap-up activity. Having a consistent structure will help your routines run smoothly.

• What is the maximum number of students you would like to have working on critical skills development during each class period? You’ll need to have one-on-one conferences with students while also periodically monitoring other students’ work. Given these constraints, consider limiting the number of students working on critical skills development to 10 during any given class period.

Decide how to set up your classroom.

• How can you maximize your ability to see at a glance whether all students are on task? Setting up the room so that you can see the screens of all computers—and the faces of all students at their desks—gives you a sense of control without having to constantly circulate around the room while class is in progress. If possible, set up the room so that you can stay in one spot and monitor everything from that position. Place the printer nearby where you can see it because there will be lots of activity there. Are there any other blind spots in the class? Try to eliminate these by assigning an aide to oversee them or by moving things around.

• How can you best facilitate independent learning with desk placement and location of reference materials? For the students working on critical skills development, you may wish to leave empty desks or space between students to encourage a quiet work environment and to allow students to focus on their own work. Reference materials can be stored on or inside the extra space or desk.

• How will you clearly indicate to students which learning station they are assigned to each day? A visual system, such as a large posted list on the wall or board, is a great solution. It can also save time and energy in facilitating smooth transitions.

Plan a system for managing resources and other materials that students will need.

• How will your students keep track of their work? Plan for each student to have her own folder or three-ring binder that stays in the classroom at all times, if possible. You may wish to include reference material such as a
hundred chart in each student's folder or binder (see the appendix for an example). This system can help ensure that no student is ever unprepared. Make sure you have bins or designated spots in the classroom where students can store their folders or binders.

- **Where will you keep the Renaissance Responders?** You may want students to begin practicing math facts right at the start of the class to maximize academic engaged time. Plan for how students will access the Responders each day, either at their desks or in a designated location.

- **Where will you store reference materials so students can easily access them when working independently?** Math textbooks, manipulatives, and copies of worked examples organized by objective can all serve as helpful references as students are working. Keep these resources in a convenient place, such as in an empty desk between students or a bookshelf along the wall, to ensure that help is always nearby.

- **What materials are needed at the learning stations? Where will these be stored?** Keep these materials handy so you minimize having to supervise the learning station setup each day. You may also want to establish a routine by designating some students to get materials out and put them away each day.

**Create a system for real-time management of student work.**

- **How will you hold one-on-one conferences while also monitoring students as they complete and score Accelerated Math assignments?** The Accelerated Math software helps make personalized practice and differentiated instruction possible, but the system works best if you plan ahead, create routines, and do a little multitasking during class. We’ll discuss these things in more detail in the next chapter once you have a better idea of how the software works.

**Streamline daily routines for the beginning of class, end of class, and transitions.**

- **How will you make sure students don’t all cluster around one spot at the beginning of class, waiting to get their materials?** Designate one or two student volunteers to pass out materials, and set up a few separate places around the classroom where those materials will be stored.

- **How will you make sure students are prepared and ready to start class as soon as the bell rings?** Teach your students a clear routine. Let them know that you expect them to be in their seats with all of their materials out on their desks when the bell rings. Also let them know that you will visually scan the room as soon as class starts to make sure they are ready to work.

- **How will you manage transitions from one activity to the next?** Teach students to look at the posted schedule for learning station assignments rather than asking you where they are supposed to be each day. Also, keeping the locations of these stations consistent helps eliminate confusion and keep things orderly.

- **What routines will students follow at the end of class?** You’ll need them to put away their folders or binders as well as any other materials they used.
during class. Some teachers also use a whole-class activity—a number sense activity such as counting aloud by sevens, for instance—to help focus their students as the class comes to an end. Students can participate in the activity while putting their materials away, allowing you to use every minute of class time in a productive way.

- Decide how you’ll communicate clear classroom rules and enforce them consistently.

  - How will you ensure that students stay on task? How will you deal with behavior problems? One of the easiest ways to enforce your classroom rules is to use a behavior modification system that allows you to reward good behavior and to discourage undesirable behavior. Have clear expectations posted in the classroom, and teach these expectations during the first few weeks. Help students practice the behaviors they should be doing at all times. One teacher uses a system of points to keep track of student behavior. If students are on task, they keep their points for the day; if they are off task, they lose points. The teacher merely asks “Are you okay?” if she sees a student who is off task and then makes a note to deduct points in her grade book. This system alerts students in a non-confrontational way that the teacher is noticing and monitoring their behavior.

  - How will you motivate students? The best way to motivate students is to set effort-based goals. In Chapters 3 and 4, we’ll discuss in more detail how you and your students can set these goals and then monitor them. For now, you can begin thinking about setting a minimum amount of work you’d like students to complete each week. You could also place a limit on the number of days a student is allowed to work on a single assignment and make a habit of collecting outstanding work every couple of days. You could also give extra acknowledgement or small privileges to students who complete more work than the minimum. Another idea is to designate every Friday as catch-up day and activity day. All students get to work in cooperative groups on game-like activities—if they’ve completed their work for the week. If not, they use that day to finish.

  - How will you teach the routines you want students to follow? Be clear and consistent in your expectations and your classroom routines. Teach them explicitly and have students practice them. Above all, be patient at the beginning of the year; routines can take three weeks or more for students to learn and internalize.

Core Routines

These are the core routines introduced here, or elsewhere, in the guide.

- Setting up the classroom
- Posting a student activity schedule
- Organizing and accessing materials
- Disseminating work
- Teaching behaviors and outcomes
- Real-time tracking of what’s happening right now
- Students correcting their own work
- Students monitoring their own progress
- Scoring assignments
- Teacher-student conferences
- Tracking daily and weekly work
- Daily planning using reports
Establish a Baseline for Measuring Growth

If your students haven’t taken a STAR Math test within a couple of weeks prior to starting with Accelerated Math for Intervention, plan to administer the test at the outset of your implementation to establish a baseline for measuring growth. Going forward, schedule periodic testing to measure growth in overall math ability over time. You’ll also set goals for this overall growth in the STAR Math software, which we’ll discuss more in the next chapter.

Students take STAR Math tests at computers by logging into Renaissance Place and clicking Take a Test under the STAR Math tab. To log into Renaissance Place, students need user names and passwords which you can find on the STAR Math Student Information Report. (Instructions for printing reports are in the appendix on p. 141 and p. 143.) You can test all students in a computer lab, or make preparations to test in your classroom. In either case, you must establish proper testing conditions for STAR Math results to be valid (see the sidebar for more information). Also, it's ideal for all students to test within a two-week timeframe so that their results can be comparable to one another.

The test consists of 24 questions, not including practice questions and a few items that are in the calibration process, and students typically finish in less than 15 minutes. After the test is completed, the software calculates a score, and you can view or print reports for a student or class. The STAR Math Summary Report will help you see, at a glance, how your students did on one test by listing scores for the latest test taken within a specified date range. Or, if your students tested as part of a universal screening process in your school or district, you can view student data on the STAR Math Screening Report. In the next chapter, we’ll look at how to utilize other STAR Math reports for determining where to begin with math fact and critical skills practice. For more information about how the STAR Math software works, please see the product overview on p. 20.
How STAR Math Works
The STAR Math assessment—used for screening, progress-monitoring, and diagnostic assessment—is a reliable, valid, and efficient computer-adaptive assessment of general math achievement for grades 1–12. Students independently complete the test in less than 15 minutes, and results are available immediately via a variety of informative, easy-to-understand reports. STAR Math identifies students’ instructional math levels, recommends Accelerated Math libraries for initial placement, and compares students’ math achievement to that of students across the nation.

Most schools administer the STAR Math test at least twice—in fall and spring—to get baseline data for each student and to measure growth over the school year. Many schools test more frequently. They use STAR Math for screening purposes in fall, winter, and spring, and they use it to monitor the progress of students in intervention programs more frequently—perhaps monthly, biweekly, or even weekly.

Test Design
STAR Math organizes its content into eight mathematical strands: numeration concepts, computation processes, word problems, estimation, data analysis and statistics, geometry, measurement, and algebra. The eight strands cover 214 core math objectives, and are based on an analysis of professional standards, curriculum materials, test frameworks, and content-area research, including best practices for mathematics instruction.

STAR Math tests consist of 24 questions, not including practice questions and a few items that are in the calibration process, and are divided into two main parts. The first part—the bulk of the test—assesses numeration concepts and computation processes. The second part covers all of the remaining strands.

STAR Math test items are presented in a multiple-choice format with four answer choices. A “not given” response option is only included for items in the computation processes strand in order to minimize estimation as a response strategy and to encourage students to actually work the problems to completion.

How Students Test
Students take STAR Math tests at individual computers. The software delivers multiple-choice items one by one, and the student selects answers by using four letter keys (A, B, C, D) and the Enter key (or return key for Macintosh computers). Students follow a protocol: They can use blank scratch paper and a pencil while testing, but no calculators or reference materials. After the test is completed, the software calculates a score, and teachers and administrators can view and analyze reports. STAR Math provides accurate data in a short amount of time by combining cutting-edge computer-adaptive technology with a specialized psychometric test design. The best way to understand how this works is to walk through the test-taking experience.

1. **The teacher reads aloud the pretest instructions printed from the software.** The instructions explain what the test looks like, how to answer questions, and what happens if a student doesn’t answer a question in the time allowed.

2. **Students start the test.** Each student takes the test at a computer by logging in with a unique user name and password. The software presents practice questions first and, if the student does fine with those, begins delivering actual test questions. The first test question will be at a level slightly below the student’s grade level. Or, if the student has taken a STAR Math test in the
previous 180 days, the software uses the results from the last test to determine the starting difficulty level for the next one. Teachers can adjust a student’s starting level in the software by entering a math instructional level, perhaps based on a score from a different test or their professional judgment. If so, the test will start with a question at a level slightly below the level entered.

3. **The software adjusts the difficulty of every item.** During the actual test, the software uses student responses to determine the level of difficulty of next items. If the student answers an item correctly, the software bumps up the difficulty level of the next item. If the student answers incorrectly, the software lowers the difficulty level of the next item. The same thing happens with the next item and the next. By continually adjusting the difficulty of an item to what the student has shown they can or cannot do, the software zeroes in on an accurate assessment of ability.

4. **Students are given a specific amount of time to answer each question.** Time limits keep the test moving and maintain test security, and were determined based on data obtained when validating the test. Students have up to three minutes to answer each item. Teachers have the option of extending time limits for individual students who they believe need more time to answer each question—English language learners, for example, or students with certain disabilities. Those students will then have twice as long to answer each question. Keep in mind that norms as well as other technical data, such as reliability and validity, are based on administering the test using the standard time limits. Therefore, if teachers do extend time limits for students, they should interpret norm-referenced scores with caution. Regardless of the time-limit setting, students receive a warning when 15 seconds remain for answering an item. Items that time out are counted as incorrect unless the student has already selected the correct answer.

5. **The test stops after the student answers 24 questions.** Each STAR Math test is individualized and unique. Because it immediately adjusts to each student’s math ability, it delivers an accurate and reliable score after only 24 questions (not including the practice questions and a few items that are in the calibration process).

6. **The software calculates a score.** We know a student’s grade level, and we know how difficult each item is for each student. Therefore we can look at a student’s pattern of right and wrong answers on a STAR Math test and provide a statistically sound estimate of the student’s ability. We also know the probability of a student answering any item correctly without presenting that item to the student.

**STAR Math Scores**

The most important score that STAR Math software reports is called the **scaled score (SS)**. It’s a fundamental measure that can be used to gauge growth over time. To help interpret the meaning of the scaled score—as to whether it’s good, bad, or middle of the road—we calculate additional scores, all of which are derived from scaled scores. These include both criterion-referenced and norm-referenced scores.

A criterion-referenced score tells how a student is doing relative to a set standard. In the case of STAR Math, **objective clusters** are included on the Diagnostic Report to show each student’s level of proficiency within numeration and computation objectives. STAR Math also reports a recommended **Accelerated Math library** for each student, which can be used as a starting point for practice in conjunction with the Accelerated Math software.

While criterion-referenced scores are based on what students should be able to do according to a set standard, norm-referenced scores relate to what students across the nation can actually do in relation to their peers. **Percentile rank (PR)** is one of these scores. A student with a percentile rank of 85, for example, performs as well or better than 85 percent of students nationwide of the same grade at the same time of year. **Normal curve equivalent (NCE)** is a norm-referenced score similar to percentile rank, but is based on an equal interval scale. **Grade equivalent (GE)**—another norm-referenced score—compares a student’s test performance to that of students nationally. For example, a GE of 4.2 means a student scored as well on STAR Math as did the typical student who is in the second month of fourth grade.
Prepare to Get Students Started with Fact Fluency

Approximately 10 minutes of your class time should be devoted to fact fluency. How should you spend this time? In the long term, it might vary from day to day due to scheduling, need for variety, or your fact fluency goals for students. You might use a variety of activities such as learning stations, flash cards, worksheets, warm-ups, and math fact practice with the Renaissance Responders. Indeed, fact fluency practice could take on many forms in your class, but the goal will remain the same: helping students develop, or become prepared to develop, automaticity with math facts. The MathFacts in a Flash software assesses and tracks students’ automaticity for you. In this section, we explain one way that students can get started with achieving their goal of automaticity: using Renaissance Responders to practice math facts and, when successful with practice, mastering levels in the MathFacts in a Flash software.

Prepare to use Renaissance Responders for math fact practice. With Renaissance Responders, students can practice independently at their desks, choosing from 40 core addition, subtraction, multiplication, and division MathFacts in a Flash levels. (See the appendix for a complete list of MathFacts in a Flash levels.) Students can also practice taking tests on Renaissance Responders by attempting to answer 40 questions correctly in two minutes or less. Although successfully completing a test on a Responder won’t count toward actual mastery, it will ensure that a student is ready to move to a school computer to master a level in the MathFacts in a Flash software. You can learn more about using Renaissance Responders with MathFacts in a Flash by referring to the 2Know! Classroom Response System Setup and Resource Guide, found under Accelerated Math on the Manuals page in Renaissance Place.

Prepare to use the MathFacts in a Flash software. Renaissance Responders operate independently of the MathFacts in a Flash software. In a sense, students control the Renaissance Responders and you control the software. You can determine a scope and sequence for the 62 levels available in the software, but any changes

Explain to Your Students Why Fact Fluency Matters

Your students will be engaged in a variety of activities that target their development of fact fluency. Before they launch into this worthwhile endeavor, make sure to discuss with students why fact fluency matters. Explain that developing automaticity with math facts, i.e., knowing the answers without having to think about them, frees up working memory for more complex problem solving. In fact, automaticity with math facts extends beyond enabling students to be confident and efficient with traditional computation algorithms. It’s also essential for the development of mental math, approximation, and estimation skills, which in turn lead to greater development of number sense.
made in the software won’t affect the levels available on the Renaissance Responders. You’ll also generate reports from the software to monitor student work, including Renaissance Responder work if students send Responder data to Renaissance Place (see the sidebar). For more information about how the MathFacts in a Flash software works, please see the product overview that follows on p. 24.

Although not necessary for students to begin practicing with MathFacts in a Flash, you can set initial levels in the software—either one for the whole class or one for each student—so students start at an appropriate level when they’re ready to work in the software, e.g., test on a level to demonstrate mastery. Remember to also communicate these starting points to students so they know which levels to focus on when practicing with the Renaissance Responders.

### Sending Data from Renaissance Responders to Renaissance Place

Students can send data from their Renaissance Responders to Renaissance Place, via the Renaissance Receiver connected to your computer, so it can be included on key MathFacts in a Flash reports. To do this, students will select “MathFacts History” on the Responder menu, and then “Send to Renaissance Place.” At this point, they’ll be notified that the data on the Responder will be deleted after transfer is complete. They must choose to continue, and then enter a unique “Responder PIN” to finish the process. Responder PINs are listed on the MathFacts in a Flash Student Information Report. (The appendix includes instructions for printing reports on p. 146.)
**How MathFacts in a Flash Works**

MathFacts in a Flash provides students at all levels with personalized practice of addition, subtraction, multiplication, and division facts, as well as other math skills, including finding squares and converting between fractions, decimals, and percentages. Timed tests at appropriate skill levels accurately measure students’ practice and mastery, with feedback provided both onscreen and via a variety of detailed reports. Feedback motivates students and helps teachers inform instruction and monitor student progress throughout the year.

MathFacts in a Flash supports sufficient and appropriate practice by:

- Providing targeted/personalized practice on math facts
- Giving immediate feedback
- Enabling customizable time goals for test sessions

By providing the means for effective practice—targeted, timed, and with immediate feedback—MathFacts in a Flash can help students develop the automaticity with math facts that will form the foundation for success throughout their mathematics careers. MathFacts in a Flash also provides the means to assess for this automaticity and track the results. In general, implementing MathFacts in a Flash involves a few basic steps.

1. **Teachers instruct.** If students attempt to memorize facts too early, without adequate concept development, they may become frustrated, discouraged, and disenchanted with the process. To avoid this, teachers guide concept development so students know the meaning of facts before attempting to memorize them. For example, students should understand that “3 × 4” means “three groups of four” or “4 + 4 + 4” before committing its product of “12” to memory.

2. **Students take a baseline test.** Students complete a 40-item timed test at the computer for each new math level. Immediate onscreen feedback provides time and accuracy data and shows any missed facts. If students answer all 40 items correctly within the time limit, they automatically move on to the next level. This allows every student to work at an individualized level and pace. Teachers can set a starting place for students in the software to provide an appropriate level of difficulty from the outset.

3. **Students practice.** Students can practice before taking a baseline test if they practice outside of the software via Renaissance Responders, Renaissance Home Connect, or MathFacts in a Flash worksheets and flash cards. (They must use the software at least once at school before they can practice in Renaissance Home Connect.) The practice sessions include a minimum of 20 items, and provide immediate corrective feedback to students. If practicing in the software, students also receive a printed TOPS Report that lists fraction and percent correct along with the specific items missed.

4. **Students take timed tests to demonstrate mastery.** Once students have successfully practiced a level, they take a timed test on a school computer to demonstrate mastery. To master a level, they must correctly answer, by default, 40 problems in two minutes or less. This rate of response helps students move away from using strategies for figuring out or deriving answers and into automaticity. At the end of the test, students get onscreen corrective feedback showing the problems they missed, the correct answers, and the time it took to complete the test. If students master a level, they can attempt a lower time goal on the same level or move on to the next one.

5. **Teachers monitor progress.** Both the Assignment Book in the software and certain key reports help teachers monitor progress of MathFacts in a Flash practice. Students can also monitor their own progress by recording time and accuracy data for each level, as well as tracking their total number of mastered levels.
When thinking about appropriate starting levels, keep in mind that students make the most progress when they work with content that is challenging enough to be engaging, but not so difficult as to be frustrating. Remember that students develop automaticity more efficiently when they practice facts with which they are already familiar; that is, facts for which they have been exposed to the relevant concepts, as well as strategies for relating them to other known facts. Also consider the personalities of students and how much they need to experience challenge versus immediate success. For example, if an eighth-grade student is struggling with basic multiplication facts, you might want to allow her to work through the addition and subtraction levels in order to gain confidence with the program and enthusiasm for higher levels. Here are a few additional ideas for setting students’ initial MathFacts in a Flash levels:

- **Start all students at the first level and let them work straight through the remaining levels.** This approach allows a high degree of initial success for most students, but it may take awhile for students to reach the level where they will make the most growth.

- **Use STAR Math data to help place students in MathFacts in a Flash levels.** The STAR Math Diagnostic Report shows where students fit on a continuum of computational skills. See the example on the next page. The bar chart at the bottom of the report indicates the skills that the student “mastered,” meaning the student’s performance suggests he could correctly answer 70 percent of the items related to those skills if all the items had been presented. The black line points to where the student is currently developing skills.

- **Use printed MathFacts in a Flash worksheets as a quick diagnostic test.** Print a worksheet from one of the cumulative review levels and give it to students as a timed diagnostic test. Observe how quickly students answer the questions and if students appear to be “figuring out” the facts. Some teachers use this approach from the “bottom up”—they start by giving the first addition-level review worksheet to all students as a timed test. Students who are successful on the first test take another teacher-timed test with the next level of review worksheet, and so on, until the teacher has found a level for each student. This method takes time, but it also provides documentation in support of a student’s initial placement. (The appendix includes instructions for printing practice materials on p. 146.)
Students master levels in the software by testing on a school computer to meet accuracy and time goals: by default, correctly answering 40 problems within two minutes. Testing on a school computer ensures that mastery results are valid—that is, students did not receive outside help and tested in a consistent, supervised setting free of distractions. (Students can also test for mastery using NEO 2s, Renaissance Learning’s portable laptops.) When students test in the software, a report (called a TOPS Report) will print after the session to tell them how they did.

By default, a MathFacts in a Flash TOPS Report will print after a student completes either a practice or a test in the software, and will include the level worked, number correct, and any incorrect problems. TOPS Reports for tests also include how long it
took the student to complete the test. You can change a preference in the software to print the TOPS Report after each practice session and/or test session, or you can disable printing altogether. (A “practice session” or “test session” includes all practices or tests the student completes after logging in and before exiting the software.) If you disable printing altogether, be sure to tell students to write down missed problems when viewing their onscreen feedback. This will help them remember which problems they need to focus on before they practice or test again. (The appendix includes instructions for setting preferences on p. 147.)

When students master a level, they choose how to proceed: they can better their mastery time by retesting on the level, or they can advance to the next available
one. If your students will retest for “best times,” be sure to make clear when they should choose to retest, and when they should move on to the next level. You can determine which levels students will encounter in the software by reordering, removing, or putting them on hold. Remember, changes in the software will not affect levels available on the Renaissance Responders. (The appendix includes instructions for working with levels on p. 144.)

**Prepare for Students to Work on Critical Skills**

Working on critical skills will comprise the majority of class time for you and your students, and you’ll use Accelerated Math to generate and manage much of this work. To get started with Accelerated Math: set up your Assignment Book, print students’ first assignments, and prepare to use Renaissance Responders for scoring assignments.

Set up your Accelerated Math Assignment Book.
The Assignment Book is your command central for managing Accelerated Math work. You’ll go there to assign work to students, check progress, print assignments, and generate reports to monitor student work and plan instruction. (For more information about how Accelerated Math works, please see the product overview on p. 30.) First, before you can perform any of these tasks, you’ll need to assign an objective list to each of your classes. Through the process of assigning an objective list, you’ll actually create the list itself or select one that has already been created.

There are many ways to create and assign lists. For example, let’s say your students have a wide range of ability levels and need to practice objectives from several grade-level libraries. You could create one comprehensive objective list, including objectives from multiple libraries, and assign it to the whole class. You could also decide to create a few different objective lists, perhaps organized by grade or skill level, and assign each to a different “group” of students. It’s up to you. Accelerated Math gives you total control of the content; on the flipside, you have a lot of options to choose from.

In the next chapter, we explore options for managing differentiated practice in the Accelerated Math software. However, especially if you’re new to Accelerated Math, you might start out with a simple approach as described in this section: use one small set of objectives from a lower-level library with all of your students. This will allow you to spend time getting acquainted with the Assignment Book and how you’ll assign objectives before transitioning to differentiated practice. It’ll also help students experience initial success with Accelerated Math while they practice
completing and scoring assignments. Then, when you and your students are more comfortable with Accelerated Math and its supporting routines, expand your use of the software to support fully differentiated practice as described in the next chapter.

To assign an objective list to your class, click Assignment Book under the Accelerated Math tab in Renaissance Place, select a class, and choose one of the options in the light green box. (See the Accelerated Math software manual for more information about the options for assigning objective lists; the appendix also includes instructions on p. 148.) Then, if creating a new list, enter a name for it and choose objectives.

To help you select objectives, view sample problems (available for all objectives) or worked examples (available for many) in the software by clicking the View Example or View Worked Example icon after an objective’s name, as shown below. To find the icons, go to the Assignment Book, click View/Edit Lists under Choose Objective List on the left, and then click View in the row of a library. The icons are also available after you add objectives to an objective list. Another way to view sample problems is by accessing library guides: click Libraries under the Accelerated Math tab in Renaissance Place, click the library name, and then click the file name ending in “LG.PDF” in the Library Documentation section.
**Product Overview**

**How Accelerated Math Works**
Accelerated Math software personalizes student math practice and helps teachers generate assignments, monitor progress, and motivate students to succeed. Teachers use progress-monitoring information provided by Accelerated Math to do what they do best—provide individualized, differentiated instruction to each student.

**Content**
Accelerated Math organizes its content into libraries of objectives, and each objective describes a specific mathematical task. Accelerated Math’s Second-Edition Libraries include grades 1 through 8, Algebra 1, and Geometry, and incorporate identification of core objectives, learning progressions, and prerequisite skills to help teachers plan and remediate instruction. The libraries are based, in part, on National Mathematics Advisory Panel (NMAP) recommendations, National Council of Teachers of Mathematics (NCTM) Curriculum Focal Points, analysis of US state and international standards, experienced Accelerated Math teacher feedback, student achievement data, and consultation with recognized mathematicians.

**Assignment Types**
Accelerated Math has four assignment types:

- **Diagnostic tests** include any objectives specified by the teacher. Teachers can use diagnostic tests to place incoming students, find critical skill gaps, and allow students to master objectives directly when they demonstrate previous knowledge of them.

- **Practices** include objectives assigned by the teacher, objectives that are ready to work (via the student not meeting success on another assignment type), or objectives that are ready to be reviewed. Practices are designed to give students an opportunity to practice or review math concepts that have been previously taught or mastered.

- **Regular tests** include objectives that a student has practiced successfully, and allow the student to demonstrate mastery of those objectives.

- **Exercises** include any objectives specified by the teacher, can have identical or individual problems (if printed for more than one student for the same objectives), and are designed to provide more practice on specific objectives after reteaching.

Accelerated Math assignments are individually generated and printed for each student. After students work assignments on paper, they submit their responses using a Renaissance Responder or other scoring device, e.g., AccelScan scanner or NEO 2 laptop. The software automatically scores the assignment and provides immediate feedback via informative reports for teacher and student. If scoring a practice assignment, the software will automatically generate and print a next practice assignment for the student, based on student performance and objectives available for practice.

**Status Symbols**
Because Accelerated Math is a personalized practice program, most of the time students will be working on different objectives on various assignment types. Teachers can keep track of student progress by viewing status symbols displayed in the software’s Assignment Book (or by viewing key reports). The symbols communicate the status of each objective for each student, which will depend upon the student meeting certain advancement criteria in the software by completing different assignment types.
### How Students Master Objectives

Students follow various pathways for mastering objectives while using Accelerated Math (see the diagram on the next page). Upon completion of assignments, students continue on a path based on whether they were successful or not with the objectives on the assignments. If a student is repeatedly unsuccessful with an objective, the teacher receives a notification to intervene (both on reports printed from the program and in the software’s Assignment Book). Following teacher intervention, the student makes another attempt to master, or practice and then master, the objective. Once an objective is mastered, it appears as a review objective on practice assignments after two weeks. If the student is unsuccessful with an objective upon review, its status changes to “intervene” and the student works with the objective again. If successful upon review, the objective becomes “reviewed” and the student doesn’t receive any more work on it.

<table>
<thead>
<tr>
<th>Status</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned</td>
<td>green</td>
<td>The teacher has assigned this objective to the student.</td>
</tr>
<tr>
<td>Ready to Work</td>
<td>green</td>
<td>The student has done some work on this objective but needs more.</td>
</tr>
<tr>
<td>Working</td>
<td>green</td>
<td>The student has a practice assignment or exercise that includes this objective.</td>
</tr>
<tr>
<td>Ready to Test</td>
<td>yellow</td>
<td>The student has done well with the objective and is ready to take a test on it.</td>
</tr>
<tr>
<td>Testing</td>
<td>yellow</td>
<td>The teacher has printed a regular test that includes this objective.</td>
</tr>
<tr>
<td>Mastered</td>
<td>blue</td>
<td>The student has done well with this objective on a test.</td>
</tr>
<tr>
<td>Intervene</td>
<td>red</td>
<td>The student needs the teacher’s help.</td>
</tr>
<tr>
<td>Diagnosing</td>
<td>yellow</td>
<td>The teacher has printed a diagnostic test that includes this objective.</td>
</tr>
<tr>
<td>Reviewed</td>
<td>gray</td>
<td>The student has successfully worked review problems on this objective.</td>
</tr>
<tr>
<td>Hold</td>
<td>gray</td>
<td>The teacher does not want the student to receive assignments on this objective.</td>
</tr>
</tbody>
</table>
To help teachers identify students’ skill gaps, work in Accelerated Math for Intervention begins with diagnostic testing. This allows students to demonstrate mastery of known objectives, and the software to place those objectives not mastered or known in the Ready to Work state for additional practice after instruction. Teachers assign additional objectives for practice as necessary.
After you assign an objective list to your class, print an Objective List Report. You may want to keep this report by your computer so you can see at a glance which objectives your students will be working with in the software. The appendix includes instructions for printing this report on p. 149 and all reports on p. 152.

**Print the first assignment.** Now that you’ve assigned an objective list to your class, you’re ready to print assignments for students. You’ll begin with diagnostic tests, one of the four Accelerated Math assignment types, since they offer the most direct path in the software for students to demonstrate understanding of an objective. By the same token, they provide the most direct signal to you if a student doesn’t understand an objective. You’ll get this information from reports that print when students score assignments, called TOPS Reports, and from the Assignment Book. Accelerated Math TOPS Reports list the student’s overall score, which objectives were included on the assignment, and how the student did with each of those objectives.

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### Diagnostic Test TOPS Report

**for Jacob Lee**

*Printed Tuesday, September 13, 2010 10:26:10AM*

**School:** North Middle School  
**Class:** Math 7A  
**Teacher:** A. Diaz  
**Grade:** 7

**Number Correct: 9 / 10 (90%)**

**Objectives Mastered: 2**

#### Incorrect Responses (1)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Problem</th>
<th>Your Answer</th>
<th>Correct Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Multiply a 1- or 2-digit whole number by a multiple of 10, 100, or 1,000</td>
<td>4</td>
<td>B</td>
<td>D</td>
</tr>
</tbody>
</table>

#### Objectives on this Diagnostic Test (2)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Results</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Round a 4- to 6-digit whole number to a specified place</td>
<td>5 / 5 100%</td>
<td>5 / 5 100%</td>
</tr>
<tr>
<td>2. Multiply a 1- or 2-digit whole number by a multiple of 10, 100, or 1,000</td>
<td>4 / 5 80%</td>
<td>4 / 5 80%</td>
</tr>
</tbody>
</table>

#### Overall Progress

<table>
<thead>
<tr>
<th>Average Percent Correct</th>
<th>Objective Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking Period (20% Complete)</td>
<td>School Year (5% Complete)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practice %:</th>
<th>Test %:</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td>90%</td>
</tr>
</tbody>
</table>

**Teacher**

**Comments:**
The Assignment Book keeps track of student progress with each objective by using a variety of status symbols: in this case, “diagnosing” 📚, “mastered” ✅, or “ready to work” ⏳. First, “diagnosing” will appear for objectives included on a student’s printed, but unscored, diagnostic test. Then, after the student scores the test, each objective will either become “mastered” or “ready to work.” “Mastered” means the student demonstrated understanding of the objective by meeting certain criteria in the software. “Ready to work” means the student didn’t meet the criteria, causing the objective to become available for the student to practice.

Printing a diagnostic test is a straightforward process in the Accelerated Math software. Go to the Assignment Book, select all students by clicking the box next to Student (or select individual students), and click Print Diagnostic under Activities on the left. Then choose which objective or objectives to include on the test (or each test, if printing for more than one student). For the first test, you might want to include just one objective, which would mean five problems on the test. After selecting the objective and choosing your preferences (make sure to leave the default “assisted response” answer format so students can score assignments with Renaissance Responders), click Print to send the tests to the printer. You’ll probably use these first diagnostic tests to teach students routines for completing and scoring Accelerated Math assignments, perhaps as described in the practice run section later in this chapter. When students score their first diagnostic tests, you can immediately print the next diagnostic tests so you have them on hand to distribute to students.

**Accelerated Math Problems**

By default, Accelerated Math problems are presented in multiple-choice format. We call them assisted-response problems because having a choice of answers helps students know if they are on the right track. After students work a problem, they can see if their answer is among the choices. If it isn’t, they know they need to try a different strategy. The answer choices for assisted-response problems are not random, however. They include answers produced by making common mistakes. By looking at an incorrect answer choice, you can often identify misconceptions. The software can also generate free-response items—problems that do not have a choice of answers. You must correct them by hand, however, using an answer key that the software provides.

**Prepare for students to score assignments with Renaissance Responders.**

Students will use Renaissance Responders to score their diagnostic tests, as well as other Accelerated Math assignments. Three components work together to make this possible: the Renaissance Responders (used by the students), the Renaissance Receiver (attached to your computer), and the Renaissance Responder software (installed on your computer). Make sure you have a Renaissance Receiver attached to your computer and open the Renaissance Responder software before asking students to score assignments with the Responders. To learn how to install the Renaissance Responder software on your computer, please see the Accelerated Math software manual.

At this point, consider a practice run as one way to get started.
After you prepare for your implementation of Accelerated Math for Intervention, consider using a practice run to introduce your students to the program. During the first few days of your implementation, use all of the components of Accelerated Math for Intervention, but at a basic level. For example, students will work on critical skills, but they’ll all work with the same objectives from a lower-level library. This will allow them to experience success with Accelerated Math for Intervention while getting acquainted with its software, hardware, and supporting routines.

During a practice run:
- Teach routines to students for how to use their class time, including how to start and end class, and how to transition throughout the period;
- Begin with developing fact fluency, having students practice math facts with Renaissance Responders; and
- Begin critical skills work, including teaching students how to complete and score Accelerated Math assignments.

Teach routines to students for how to use their class time. The time in any Accelerated Math for Intervention classroom is divided into three main parts: the beginning of class (typically includes getting materials and a warm-up exercise), the middle (includes activities involving fact fluency and critical skills), and the end (typically includes putting away materials and a wrap-up exercise). First, we focus on beginning, end, and transitions. Next, we discuss routines for activities that take place in the middle of the class period.

- **How to start and end class.** We already discussed things to consider when developing routines for starting and ending your class. After you’ve developed your routines, explicitly teach them to students during the practice run. Be clear about your expectations, the actions students need to take to meet them, and the consequences for not meeting them. Model the routines, and give explicit, corrective feedback as students try them out. Walk through routines with them—stand behind them or next to them. Remember to focus on the goal—students staying on task so they can start and end on time—and determine if your routines help students get there.

- **How to transition.** We also previously discussed the importance of developing routines to help students seamlessly transition from one activity to another. The practice run provides a great opportunity to try them out. If you notice that students are confused about where they should be, or when they should be there, examine the routines. Do you need to post a schedule? Make a posted schedule clearer? Allow more time for students to practice the routine? Be sure to make any necessary adjustments before taking the next steps with your implementation. As a general rule, routines are more difficult to change the further you get into an implementation. So, if things aren’t going as planned with transitioning, it’s important to get students back on track right away.

Begin developing fact fluency. Your students will engage in fact fluency activities for at least 10 minutes a day, five days a week, or the equivalent. Simple and engaging, Renaissance Responders are a great way to get students started with the fact fluency portion of your class. Students might use Responders every day, starting with math fact practice as soon as they arrive at their desks. Or you might decide to limit practicing math facts with Responders to just a few days a week, making room in the schedule for other fact fluency activities, e.g., number sense activities or group warm-ups. Either way, students can use Renaissance Responders right away, without prior setup on your part. Students turn on the Responders, choose to practice math facts, and then choose a level to practice. They receive immediate onscreen feedback when they complete a level, and can then attempt the level again or move on to another one.

Earlier in the chapter, we discussed several ways to identify starting levels for students’ math fact practice. For the practice run, you might tell all students to start with the same level—making it a lower level to ensure success—just to get them comfortable with using the Renaissance Responders. If you
want students to send a record of this practice to the MathFacts in a Flash software, make sure the Renaissance Receiver is connected to your computer (see the sidebar on p. 23 for more information). To learn more about how students use Renaissance Responders for MathFacts in a Flash practice, please see the 2Know! Classroom Response System Setup and Resource Guide, found under Accelerated Math on the Manuals page in Renaissance Place.

Practicing math facts with Renaissance Responders is a primary way for students to develop fact fluency, but it likely won’t be the only way. It’s important to consider other activities that will support development of fact fluency in your classroom: warm-up and wrap-up exercises, learning stations, math fact practice with computers or flash cards, or possibly computation tests mandated by your school or district. Some of these activities help students build the conceptual foundation necessary for learning math facts, while others urge them toward developing automaticity.

During your practice run, decide which activities to get up and running from the start to support your implementation down the road. For example, if you plan to use stations, establish them at the beginning so students get used to rotating through them and performing the related activities. Or perhaps you’ll need to make time for regular activities outside of Accelerated Math for Intervention, such as mandated computation tests. Taking time upfront to think about the “big picture” will help things run more smoothly in the long run.

**Practice Run Assignments**

During the practice run, students will be completing diagnostic tests that include objectives from a lower-level library. Therefore, it’s critical to explain to students the purpose of diagnostic tests, and why these particular tests may not seem challenging to them. You’ll use diagnostic tests to find out what students already know and what they’re ready to learn. Even though “test” is on the assignments, you’re not assessing if students have learned skills for which you’ve given instruction and which they’ve practiced. Also, explain that the problems on the diagnostic tests might not be new to them because so many other things are—the Accelerated Math software, Renaissance Responders, and supporting routines. Once they’re comfortable with the process of completing and scoring Accelerated Math assignments, they’ll be ready to tackle new material. For now, they’re just getting warmed up.

period, generating and managing much of the work. We already discussed how you might set up your Accelerated Math Assignment Book for a practice run: use one small set of objectives from a lower-level library with all students. We also explained how to print diagnostic tests for students after setting up the Assignment Book. Use these tests during the practice run to teach students how to complete and score assignments.

- **Distribute the first assignment.** Here’s an opportunity to put an important routine in place: how will students get work at the start of class? We already discussed creating a binder or folder for each student for Accelerated Math work. Put students’ tests in these binders or folders so students have what they need at the start of class. Going forward, you can distribute any additional work that you print for students in this way.

- **Prepare your computer for scoring Accelerated Math assignments.** Connect a Renaissance Receiver to your computer and open the Renaissance Responder software so students can score Accelerated Math assignments with Renaissance Responders. To learn how to install and use the Renaissance Responder software, please see the Accelerated Math software manual.
• **Students complete and score the assignment.** We suggest that you guide students step-by-step in completing and scoring their first assignments. Refer to the directions below, and consider making a photocopy of a student’s test (with the student’s name covered) and projecting it to support your explanation. Direct students to score assignments one at a time so they can individually retrieve their TOPS Reports.

1. **Complete the problems**, making sure to show your work.

2. **Circle your answer choice.** Also write the answer choice to the left of the problem so you can more easily score your assignment.

3. **Enter your answers** with a Renaissance Responder. Press the On/Off button for a few seconds until the Responder turns on. Join the session to connect with the computer, enter your form number, and then enter your answers using the letter keys. When finished, submit your work.

   *(You may want to check that students have shown their work before they submit answers.)*

4. **Go to the printer** to pick up your TOPS Report. Put the TOPS Report together with your assignment and any paper showing work, making sure the TOPS Report is on top. Staple everything together. Also pick up a next assignment from the printer if there is one.

   *(More detailed instructions for how students input answers with Renaissance Responders can be found in the Accelerated Math software manual.)*

5. **Bring your TOPS Report** to the teacher.

   After students bring their TOPS Reports to you, decide if they’re ready to complete another next diagnostic test or if they should stop diagnostic testing for the time being. *(We’ll look at TOPS Reports in more detail in the next chapter, along with other Accelerated Math routines.)* During this practice run, most students should be successful with their first diagnostic tests since they’ll be working with lower-level objectives that you chose for this purpose.

• **Make sure students have work.** Accelerated Math won’t automatically print a next assignment when students score their diagnostic tests. Therefore, it’s important that you have a next assignment ready for students so they can continue working. For the practice run, print next diagnostic tests as soon as students score their first ones. Allow students to complete and score their next tests independently so they can practice the routines you set in place. As you shift to fully differentiated practice and begin using other assignment types, Accelerated Math will take care of some of the assignment generation and printing for you. We’ll also look at reports and other tools that can help you keep track of who needs work printed.

**When does a practice run end?** The official end of a practice run is up to you. Are students accustomed to the basic routines? Do they know where they should physically be, and what they should be doing, throughout the class period? Are you comfortable with the software and hardware? If so, then you’re probably ready to take the next steps with your implementation. As you move forward, remember to reinforce existing routines even as you teach new ones to students. In the next chapter, we look at some of these new routines and how they support the use of Accelerated Math.
Planning Checklist

- Become familiar with the components of Accelerated Math for Intervention.
  - Obtain your Renaissance Place address (URL), user name, and password from your technology administrator.
  - Log into Renaissance Place to locate manuals and other resources (by clicking Manuals in the upper right corner of any page, and by clicking Resources under STAR Math, Accelerated Math, and MathFacts in a Flash).
  - Connect the Renaissance Receiver to your computer, install the Renaissance Wireless Server Utility, and set up the Receiver. For more information, see the 2Know! Classroom Response System Setup and Resource Guide.

- Decide how to manage your classroom.
  - Envision the activities you want to have happen in the classroom.
  - Decide how to set up your classroom.
  - Plan a system for managing resources and other materials that students will need.
  - Streamline daily routines for the beginning of class, end of class, and transitions.
  - Decide how you’ll communicate clear classroom rules and enforce them consistently.

- Establish a baseline for measuring growth by administering the STAR Math test to your students (if students haven’t already tested within a couple of weeks prior to starting with Accelerated Math for Intervention).
  - Schedule time in the computer lab for testing or prepare to test students in your classroom.
  - Locate and print the STAR Math pretest instructions by clicking Pretest Instructions under the STAR Math tab in Renaissance Place.
  - Print the STAR Math Student Information Report—it includes the user names and passwords that students will use to log into Renaissance Place to take the STAR Math test.
  - Make sure that students have blank scratch paper and pencils to use during the test, but not access to calculators or other resources.
  - Administer the test. To ensure students test under standardized conditions, read aloud the pretest instructions to students before their first STAR Math test, as well as before any additional tests as you deem necessary. Also ensure the testing environment is free of distractions.
  - View or print reports, such as the STAR Math Summary Report, to see students’ results.

- Prepare to get students started with fact fluency.
  - Practice using a Renaissance Responder for math fact practice to get a feel for the student experience.
  - Determine students’ starting levels for math fact practice.
  - Communicate to students which levels they should practice on the Renaissance Responders.
  - Set initial levels in the MathFacts in a Flash software.
Prepare for students to work on critical skills.

- Set up your Accelerated Math Assignment Book. To start, consider using a small set of objectives from a lower-level library for all of your students. Then, when you are comfortable with the software, hardware, and supporting routines, broaden your use of the Accelerated Math to support fully differentiated practice (as described in the next chapter).
- Print an Objective List Report for each of your classes.
- Print diagnostic tests for students.
- Install the Renaissance Responder software on your computer so students can score Accelerated Math assignments with Renaissance Responders. See the Accelerated Math software manual for more information.
**Summary**

- A few preparation tasks are essential to every implementation of Accelerated Math for Intervention: become familiar with the program’s components, decide how to manage your classroom, establish a baseline for measuring growth, and prepare for fact fluency and critical skills work.
- Accelerated Math for Intervention includes software and hardware components, and is supported by several teacher and student routines.
- Careful planning and classroom management create the structured environment necessary for Accelerated Math for Intervention to reach its fullest potential.
- Administering a STAR Math test at the outset of your implementation will help you measure students’ growth in overall math ability over time.
- Students can get started with developing fact fluency by practicing math facts with Renaissance Responders and mastering levels in the MathFacts in a Flash software.
- To prepare for students to work on critical skills, set up your Accelerated Math Assignment Book, print students’ first diagnostic tests, and prepare to use Renaissance Responders for scoring Accelerated Math assignments.
- A practice run creates a low-risk setting for students to learn routines while becoming acquainted with Accelerated Math for Intervention’s software and hardware components.
Chapter 3
Getting Started

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Getting Started

You’ve done all the prep work with the software, hardware, and routines. Now it’s time for the ingredients of your implementation to hit the pan and start to sizzle. In fact, you might have already started cooking if you launched Accelerated Math for Intervention with a practice run, as described at the end of the last chapter. In this chapter, we look at how you can get started with the next steps of your implementation.

We begin by explaining how to get started with individualized critical skills work, including identifying appropriate objectives for students' critical skills work; managing differentiated practice in the Accelerated Math software; and using a variety of assignment types to guide students through a cycle of practice, test, and review. We also discuss one way to monitor students’ development of fact fluency by checking who is regularly practicing and testing with MathFacts in a Flash and who may need your help. We conclude by looking at the initial process of setting goals for your students, including both effort-based goals and goals for the development of overall math ability. At the end of the chapter, you’ll find a checklist of key tasks to perform during this getting started phase of your implementation.

Build Foundation of Critical Skills

Students who require intervention are behind their peers—often by several grade levels—but each still has a foundation of math skills. When a student comes to your intervention class, it’s your task to first determine the extent of that foundation, and then plan how to move forward. Should you teach, or reteach, all of the skills the student is lacking from the previous two or three grade levels? Or, should you focus on specific skills identified as “core” to success in mathematics? However you decide to proceed with critical skills work, Accelerated Math for Intervention will support the process by providing information to help you identify a starting point for each student; generating, scoring, and managing individualized math practice; and creating opportunities for you and students to meet one-on-one for focused instruction and reteaching. To get started, you’ll identify objectives for students’ critical skills work,
perform a few tasks in the software, and establish additional routines for you and your students.

**Identify objectives for critical skills work.** Accelerated Math lets you choose which objectives your students will work with to develop critical skills. You’ll identify these objectives by creating a list in the software, or choosing one that has already been created, and assigning it to students. The list could include all of the objectives from an Accelerated Math library or libraries, or only a subset of those objectives, e.g., those identified as core to success in mathematics (see the sidebar). Students will start at the beginning of the list, or with the objectives closest to their skill level, and work their way through the objectives by completing diagnostic tests. Their success with the objectives, and when that success begins to diminish, will tell you where on the list you should temporarily stop diagnostic testing and shift to practice mode.

In the following sections, we’ll look closely at each step of this process. Here, we’ll focus on how to identify an initial Accelerated Math library for each student.

To identify students’ initial Accelerated Math libraries, you can consult multiple sources, including recommendations of general education teachers, class work, and information from STAR Math and other standardized assessments. If you administered STAR Math to your students at the outset of your implementation, refer to the STAR Math Accelerated Math Library Report to find recommended Accelerated Math libraries for students based on their STAR Math test scores. The appendix includes instructions for printing STAR Math reports on p. 143.

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**Core Objectives and Learning Progressions**

Core objectives are the most critical mathematics objectives for a student to learn at a grade level. Students need to have proficiency with core objectives to be successful in math at their grade level and to progress in the grades that follow. Each core objective fits into a progression of math skills. Combined, the core objectives and learning progressions provide guidelines and information for coherent, progression-based instruction and practice that emphasizes key math objectives. They were developed by Renaissance Learning, based upon expert review and research that considered the NCTM Curriculum Focal Points, the National Math Panel Final Report recommendations, and analysis of mathematics standards from nations and states with high-quality mathematics standards. A white paper titled *The Development of the Accelerated Math Second-Edition Libraries* is available by contacting Renaissance Learning at research@renlearn.com.

The Learning Progressions for Instructional Planning, accessed in the Accelerated Math software and further discussed in Chapter 5, support identification of core objectives within a grade or skill area, and include prerequisite skills, worked examples, sample problems, and related terminology for objectives.
Because STAR Math recommends an Accelerated Math library for each student at an instructional level, we suggest that, for students in intervention, you begin with a library that is one grade lower than the recommendation. Or, if STAR Math recommends a choice of two libraries, begin with the lower of the two. This will provide an appropriate level of challenge, without causing frustration, so students can experience initial success with Accelerated Math. Also, since diagnostic tests help you identify each student’s foundation of skills, as well as where it begins to break down, starting with a library that is one grade lower than the recommendation can better establish which objectives a student already understands.

Manage differentiated practice in the Accelerated Math software. If you used a practice run to introduce your students to Accelerated Math for Intervention, then you already started managing student practice in the software: You created a small list of objectives to use with all of your students, primarily to teach routines. Now that you and your students are more comfortable with the software, and you’ve identified initial Accelerated Math libraries for students, you’re ready to transition to differentiated practice. To manage differentiated practice in the Accelerated Math software, you have two options: (1) use one comprehensive objective list for your whole class; or (2) use an objective list for each “group” in your class. Option 1, a comprehensive list, would include objectives from all of the Accelerated Math libraries you identified for your students; Option 2, an objective list for each group, would include only the objectives that pertain to the students in the group. Below we
outline the basics of both options for managing differentiated practice in the Accelerated Math software. As you become more experienced with the program, explore how each of these options (or a combination of the two) best suits the needs of you and your students.

**Option 1: Use one comprehensive objective list for your whole class.** Building one comprehensive list for your whole class might mean a long list. At the same time, you’d quickly become familiar with the objectives and numbering, especially if you plan to use the list for multiple classes or across multiple school years. Working with one objective list also creates a common language amongst your students, i.e., “objective 36” will be always be objective 36 for all of your students (see the sidebar). If you’re using a practice-run objective list with your class, add to the list so it covers the range of objectives that your students will work with to develop critical skills (see the instructions in the appendix on p. 150). If you chose not to use a practice run, create a new list, adding the Accelerated Math libraries that you identified for students, and assign it to your class (see the instructions on p. 148). In either case, print an Objective List Report so you can see at a glance which objectives your students will be working with in the software (see the instructions on p. 149).

Let’s look at an example of how a teacher uses Option 1 to manage differentiated practice in Accelerated Math. Mr. Avalos uses Accelerated Math for Intervention in three classes. His students worked with the same lower-level objectives during a practice run of Accelerated Math for Intervention while learning classroom routines at the beginning of the school year. After the practice run, Mr. Avalos transitioned to differentiated practice. He reviewed the STAR Math Accelerated Math Library Report to help identify initial Accelerated Math libraries for his students. He decided to add objectives from four of the grade-level Accelerated Math libraries to his practice run objective list to encompass his students’ wide range of skill levels. As a result, Mr. Avalos uses the same comprehensive objective list for all of his classes. When he prints a diagnostic test for each student to launch differentiated practice, he includes the objectives that are closest to each student’s skill level.

**Option 2: Use an objective list for each group in your class.** To understand how groups work in Accelerated Math, let’s look at another example. Mrs. Jones teaches an Accelerated Math for Intervention class of ten students. Her class also worked with lower-level objectives during a practice run of Accelerated Math for Intervention while learning classroom routines. Mrs. Jones then transitioned to differentiated practice. She also reviewed the STAR Math Accelerated Math Library Report to help
identify initial Accelerated Math libraries for her students. She decided to divide her class (a group, by default) into three additional groups; each group works with a different objective list.

Class (Group 1)  
Josh Ade Erik Kim Eva  
Ben Zara Maya Leo Zoe

Objective list 1  
objectives for “practice run” and other whole-class activities

Group 2  
Josh Zara Maya Leo

Objective list 2  
all objectives from the Grade 5 Library

Group 3  
Ade Erik Kim Eva Zoe

Objective list 3  
core objectives from the Grade 4 Library

Group 4  
Ben

Objective list 4  
core objectives from the Grade 3 Library

As a result, Mrs. Jones uses four different objective lists in her class Assignment Book: one for the whole class, which includes the objectives she used in her practice run, and three additional lists—one that includes all the objectives from a grade-level library and two that include only the core objectives from grade-level libraries. Students mostly work with objectives from their group objective list, but they also do some work with the class objective list, e.g., when learning a new routine or working with a small group on a special topic. Mrs. Jones views work for each group separately in the Assignment Book and also uses the class overview to see the big picture. She also views student work by group on several of the key Accelerated Math reports.

There are several possibilities for using groups in the Accelerated Math software:

- **Small groups, each with its own objective list.** This is how Mrs. Jones chose to use groups. She divided her whole class into three small groups and uses an individual objective list with each of them.

**Groups in the Accelerated Math Software**

It’s important to keep in mind that Accelerated Math groups help manage objectives in the software; they aren’t meant to group students for instruction. Of course, the two purposes may overlap. If you group students in your classroom according to skill level, you might want to create the same groups in the software and assign an individual objective list to each of them. That’s certainly possible. However, in Accelerated Math for Intervention, instruction will primarily take place one-on-one. Therefore, while students may be assigned to “groups” in the software, they may not be working in groups in the classroom.
• **Small groups, each with the same comprehensive objective list.** Create several small groups and assign the same comprehensive objective list to each of them. The groups would be defined by their different starting points on the comprehensive list.

• **Groups of one.** Some students, like Ben in Mrs. Jones’s class, might be in a group of one.

Here are some additional tips to keep in mind when working with groups in Accelerated Math:

• **Students can be in more than one group at once.** That could mean two groups at once, or three or four, depending on how you use grouping. If you started your implementation with a practice run, then you already assigned an objective list to one group—the whole class—and can make additional groups from there. Students remain in the class group while also appearing in any of their additional groups. (If you didn’t start with a practice run, you might still choose to assign an objective list to your class group, especially if you anticipate, at some point, all of your students working with the same set of objectives.)

• **Performance is attached to the student.** If a student masters an objective, the objective always shows as “mastered” for the student (unless you reset it yourself, which we don’t recommend). This helps you keep track of student progress, even if you have students move between groups to work with different objective lists.

• **Students can only have one assignment, per type, per group, at a time.** Let’s return to our example of Mrs. Jones on p. 46. The student named Josh is in two groups: Group 1 and Group 2. Josh participated in the class practice run and currently has an outstanding diagnostic test in Group 1. Therefore, Mrs. Jones can’t print Josh another diagnostic test from Group 1 until he scores his current diagnostic test. However, Mrs. Jones wants Josh to begin working with objectives that are closer to his skill level—those in Group 2. Mrs. Jones prints Josh a diagnostic test from Group 2. Now, Josh has two diagnostic tests: one from Group 1 and one from Group 2.

To create groups in Accelerated Math, go to your Assignment Book, choose a class, click Create Group under Groups on the left, and follow the onscreen instructions. (For more detailed instructions for working with groups, please see the Accelerated Math software manual.) After creating groups, use the Group dropdown list to toggle between them within a class Assignment Book. Before you can generate and print assignments for students from their groups, you have to assign an objective list to each group. To do this, follow the same steps that you used for assigning a list to your class during your practice run (see the instructions in the appendix on p. 148). The Accelerated Math software manual also includes detailed instructions for working with objective lists.
Meet with students to discuss starting points. Get buy-in from students. When transitioning to differentiated practice, meet with students one-on-one to discuss their starting points. You might share STAR Math scores, or other documentation that you used to determine starting points, during this meeting. Explain that the starting point is indeed a “start,” so there’s also a finish line, or end goal. This might mean the achievement of individualized effort-based goals or being ready for grade-level material. (We’ll discuss setting goals in more detail in a later section.) Then focus on the path to get from start to finish. If students are several grade levels behind, assure them that they won’t repeat the material from each grade in the same manner. Instead, you’ll pinpoint where they need help the most so that they can more directly catch up with their peers. And remind them that you won’t be starting from scratch—acknowledge the foundation of skills, however limited it might be, that every student brings to an intervention class.

Use diagnostic testing to find each student’s edge. You’ve already identified Accelerated Math objectives for your students’ math practice. Now you’ll use diagnostic tests to find out which of these objectives students already understand and which might be unfamiliar to them. Print a diagnostic test for each student that includes the first few objectives from the objective list or the first few objectives from the point on the list closest to the student’s skill level. (We discussed how to print diagnostic tests in the previous chapter; the appendix also includes instructions on p. 151.) If the student is successful with the objectives on the first diagnostic test, print another diagnostic test, and so on, until you find each student’s edge—the point on the objective list where a student’s success begins to diminish. When this happens, shift students to practice mode so that, with your support, they can work to master unknown objectives and build their foundations of critical skills.

The Purpose of Diagnostic Tests
When you begin using diagnostic tests in earnest, explain to students their purpose. Diagnostic tests are radically different from the typical tests that follow practice. But students may see “test” and assume poor score equals poor performance, so “Bad job!” In the case of diagnostic tests, you are purposefully looking for the place where students do not know how to work the problems. (So, “Great, we found it!”) Students take the diagnostic tests cold. You and your students are on the hunt for where instruction should logically begin. You’ll use diagnostic tests to find this place initially. Then, going forward, you’ll shift between practice and diagnostic testing modes to efficiently provide instruction where students need it most.

Temporarily stop diagnostic testing and begin with practice. When you initially find a student’s edge, shift to the practice mode by printing a practice assignment for the student. Meet one-on-one with the student to review or reteach the objectives.

Keep in mind that diagnostic tests enable students to quickly show mastery of objectives by meeting certain criteria in the software, four out of five correct. (If they don’t meet the criteria, the objective becomes available for practice, i.e., “ready to work.”) Students will see if they mastered objectives by viewing the TOPS Report that prints immediately after scoring. See an example of the Accelerated Math Diagnostic Test TOPS Report on p. 33. You can also keep track of student performance by checking the status of objectives in the Assignment Book. In fact, during this preliminary diagnostic testing stage, leaving your Assignment Book open will allow you to frequently check progress and print additional diagnostic tests as necessary.
To print a practice, go to the Assignment Book, choose a group if necessary, select the student, and click Print Practice under Activities on the left. Then choose a practice size. We recommend that you use small practices, which should take students about 10 minutes to complete. (Medium and large practices should take about 20 and 30 minutes, respectively.) Small practices limit the scope of the assignment, causing students to see fewer objectives on each practice. This is especially important if a student has several objectives in “ready to work” status; the software will pull from this pool of objectives when it generates and automatically prints the next practice for the student. For this reason, try to avoid having too many objectives in “ready to work” status—perhaps limiting the number to about three or four—until you know more about your students and how quickly they’ll work through practices. To set your default practice size to small, or to change the amount of time practices should take to complete, use the Practice preference in the software (see the appendix for instructions on p. 153).

Once students are in the practice stage, Accelerated Math automatically prints next practices for them if objectives are available for practice, i.e., they’re “ready to work” or “assigned.” As we’ve already discussed, objectives become “ready to work” if students aren’t successful with them on a diagnostic test (or an exercise, which we’ll see in a later chapter). You cause objectives to become “assigned” by assigning them in the software: go to the Assignment Book, choose a group if necessary, select a student, click Assign under Activities, and then choose the objective or objectives to assign. If objectives aren’t eligible for practice, Accelerated Math will stop automatically printing next practices. It won’t know what to put on them. If that happens, build up additional “ready to work” objectives through diagnostic testing, or assign objectives you know the student needs to practice. Then print a practice for the student to restart the process. Going forward, as you shift between practice and diagnostic testing modes to target instruction, monitor the “ready to work” objectives and assign additional objectives, as necessary, so there are enough in the queue to enable automatic printing. We’ll look at a report later in this chapter that can help you keep a handle on who needs objectives assigned or a diagnostic test printed.
Overview of the Accelerated Math student cycle: practice, test, and review.
Now that students are working with practices, let's take a step back. A huge shift has taken place. While diagnostic testing, you and your students were on a mission to identify gaps in knowledge. Now that you know which objectives each student should begin working with, and have printed practices for that purpose, your goal has changed to that of the practice mode: teach/reteach, practice, test, and review to fill gaps and build upon students’ skill foundations. The practice mode is where efficient, targeted learning happens. When students consistently become successful with their practice objectives, you might choose to shift back to diagnostic testing mode to efficiently identify the next gap in knowledge. We’ll consider how to shift between practice and diagnostic testing modes later in this chapter, but first we’ll look at the student cycle that takes place in the practice mode: practice, test, and review.

As students work on assignments, they practice content until they know it, test to show mastery, and review to cement learning.

- **Practice.** Students practice objectives until they know them. They do this by working problems on practice assignments, with the help of your guided instruction, until they become “ready to test” on objectives by meeting criteria in the software (five out of the last six problems correct; 18 problems maximum).
- **Test.** Students demonstrate mastery of objectives by completing regular tests, another of the Accelerated Math assignment types. Regular tests are printed by you, include “ready to test” objectives, and enable students to master objectives if they meet criteria in the software (four out of the last five problems correct; 10 problems maximum).
- **Review.** A couple of weeks after objectives are mastered, they automatically appear as review objectives on students’ practices. For each review objective,
a practice will include one problem until the student successfully meets the review criteria in the software (three out of the last four problems correct; eight problems maximum). The objective then becomes “reviewed,” or “retired” in the sense that it won’t be included on any more assignments.

To identify if a student is having trouble in any of these stages, regularly check TOPS Reports, meet with students one-on-one, and check progress in the Assignment Book. Accelerated Math also provides a fail-safe measure: it flags objectives with an “intervene” symbol — both in the Assignment Book and on reports like the Status of the Class Report discussed later in this chapter—if students complete the maximum number of problems for a stage without advancing to the next one. When you see the intervene symbol, it means that a student needs extra help while working on an objective. In fact, Accelerated Math won’t give additional work on intervene objectives until you tell it to. Do this by printing a diagnostic test or an exercise (another of the Accelerated Math assignment types) after providing additional instruction to the student. Printing an assignment clears the intervene symbol from the software and enables the student to work with the objective again. We’ll discuss working with the intervene symbol further when we look at the Status of the Class Report. (For more information about advancement criteria in Accelerated Math, please see the product overview on p. 30.)

**Students use regular tests to demonstrate mastery of practiced objectives.** We’ve already discussed the role of regular tests in the student cycle of practice, test, and review. Students complete regular tests to demonstrate mastery of objectives that they’ve successfully practiced. Regular tests look like diagnostic tests, but in other respects they differ. Each has a different purpose that drives test composition and timing. Diagnostic tests help you see what students already know and what they’re ready to learn, so they precede instruction and practice, and you choose which objectives to include. Regular tests confirm students’ understanding of practiced objectives, so they follow instruction and practice, and only “ready to test” objectives are eligible to be included. The goal of diagnostic tests is to zero in on objectives just beyond the student’s reach; for regular tests, students are aiming to show mastery of content they’ve already practiced.
View the “Test (Ready)” column of the Assignment Book to see how many testable objectives each student has. (You can also view the Status of the Class Report, which we’ll look at later in this chapter, to see the number of testable objectives.) We recommend printing regular tests for students when they’re ready to test on one or two objectives. Including a small number of objectives both narrows the scope of the assignment and increases the likelihood that students will test on objectives soon after they become ready to test on them.

To print a regular test, go to the Assignment Book, choose a group if necessary, select the student, and click Print Test under Activities on the left. You’ll then see a list of “testable objectives” on the right. These are all the objectives that can possibly be included on the student’s test. Enter “one” or “two” as the maximum number of objectives to control how many of those listed will actually go on the test. If you don’t change this number, it will default to five, making it possible for students to see up to five objectives on a test if they have a large number of testable objectives.

**Shift between practice and diagnostic testing modes to efficiently target instruction.** Move students back and forth between practice and diagnostic testing modes to efficiently target instruction. To determine when these shifts should take place, consider the following:

- *Do you know which objectives a student needs to practice?* If not, use diagnostic tests to identify the next objectives on the student’s assigned
objective list that cause the student difficulty. Provide additional instruction and practice for those objectives in order to move the student to mastery.

- **Is a student quickly mastering objectives by practicing and testing?** If so, the objectives might already be known to the student. Shift to diagnostic testing mode so the student can quickly show mastery of objectives, enabling you to efficiently find the next gap in the student’s understanding.

- **Is the student definitely unfamiliar with a group of objectives?** Or, **do students volunteer that they don’t know how to complete the problems on a diagnostic test?** In either case, you might skip diagnostic testing altogether and go straight to practice mode. This will save you and your students time, and can help prevent your students from becoming frustrated.

### Create a system for real-time management of student work.

Your students are working at individualized levels, you’re determining when students should shift between diagnostic testing and practicing, and you’re checking in with students about their work. How do you manage all of this? We’ll look at a few tools built into Accelerated Math for Intervention that can help, including the Status of the Class Report in the next section. Here, we’ll discuss the importance of creating a system for real-time management of student work.

Managing work within a class period is crucial to sustaining work flow: checking that assignments are completed, meeting one-on-one with students, reviewing TOPS Reports, noting who needs to meet with you, and possibly printing new assignments. Of course, a management system like this, so closely tied to the pulse of your class, will likely develop naturally to meet the specific needs of you and your students. However, to help you anticipate what you’ll need to manage, view the classroom diagram on p. 15 as you consider the following.

- **Check work before students score assignments.** Teach students to show you their work before scoring assignments. Quickly skim to make sure they’ve shown work for each problem and aren’t completely off course. This is a preemptive measure to troubleshoot guessing, failing, and becoming frustrated.

- **Keep track of results after students score assignments.** After students score, have them staple together their assignment, work (if on separate paper), and TOPS Report, and show the packet to you immediately. Was the student successful? Great. Some teachers record the score for the assignment in a gradebook or on a daily tracking sheet before giving the go-ahead for the next assignment. Did the student struggle? Mark it down. Again, some teachers record the score in a gradebook or on a daily tracking sheet before letting the student attempt to correct the missed problems. Of course, Accelerated Math also keeps track of results for you, but knowing each student’s status during the class period helps you keep students working and prioritize with whom you need to meet.

- **Help students sign up for one-on-one conferences with you.** Create a sign-up sheet for one-on-one conferences and keep it at your desk (or another location
where you meet with students). Explain to students when and how they should sign up for help. Also direct students to sign up for a conference if you see that they struggled with an assignment. Using the sign-up sheet, call students as you're ready to meet with them. This system puts getting help in the hands of the students. You’re not singling them out as doing poorly; rather, they’re coming to you because they want to succeed. At the end of each day, check for names of any students you weren’t able to see. They’ll be first up the next day.

- **Teach students what to do while waiting for one-on-one conferences.** Teach students to look over any problems they missed and refer to worked examples and other resources while waiting for your help. Explicitly teach this routine to students, providing examples and reinforcement. You may even want to create a form to guide students as they check their work, such as the sample Accelerated Math Correction Sheet included in the appendix.

- **Control traffic.** So far, we’ve talked about teachers being seated during the Accelerated Math cycle and having students come to them. If you decide to go this route, devise a system so that clusters of students don’t surround your desk (or other location where you meet with students). Teach students to wait on either side of you when they need work checked before or after scoring. Students meeting with you one-on-one can be seated next to you. Of course, you’ll need to pull away from one-on-one conferences for a moment to skim the work of students waiting, but these brief interruptions will eventually become an expected part of the routine.

- **Keep students working.** If students are working with practices, Accelerated Math will continue to print next practices for them as they score as long as objectives are “ready to work” or “assigned” in the software. However, when students score tests or exercises, Accelerated Math will not automatically print a next assignment. To ensure students can keep working, give them more than one assignment at a time—e.g., a diagnostic test and a practice, or a practice and a regular test—or have a new assignment ready when needed. Later in the chapter, we’ll see how the Status of the Class Report can help you anticipate who will need work printed before or during class.

- **Be prepared to multitask.** With many plates spinning at once, a sophisticated sense of timing is essential. Where should you direct your attention at any given moment? Who needs to score work? Who needs to meet with you? Who just scored an assignment? This will take time. Expect to drop a few plates, especially when just beginning. Hang in there. Be clear with your expectations and consistent with your actions. Eventually, the supports you thoughtfully and deliberately put into place will take on the burden of managing the workflow. Then you can spend your time where it matters most: teaching students.

**Meet one-on-one with students for reteaching.** We’ve talked about how students sign up for one-on-one conferences, but what happens during the conferences? Let’s set the stage. Students independently work assignments at their desks. When finished, they bring their work to you so they can get the go-ahead for scoring. At this point, you might stop some students (if they’re completely off track, for example) and have them sign up for a one-on-one conference. Or you give the go-ahead for
scoring, but see that students struggled when you review their TOPS Reports. At this point, you’d ask them to sign up for a conference.

Now you have a list of students who need help. Work your way down the list, from top to bottom, calling students up one by one. Again, there might be exceptions to this order depending on what you know about your students and their work, e.g., capacity for waiting or nature of the misunderstanding. Students come to you for a one-on-one conference—a two-way dialogue that centers on the student’s TOPS Report, related assignment, and work. We refer to this as the “TOPS Report conference.”

Use TOPS Report conferences to teach or reinforce skills. At the time of a TOPS Report conference, the student has already worked problems for an objective, scored them, and possibly tried to rework missed problems after consulting resources. When he meets with you, the student brings evidence of all his work with him. He uses it to explain what he did, perhaps with the guidance of probing questioning on your part. You can then diagnose the source of the student’s misunderstanding. Maybe it’s a procedural or computational issue, or maybe it’s something deeper, like a conceptual misunderstanding.

If you need to reteach an objective, you’ll likely use a variety of strategies depending on the content and the student. (Chapter 5 includes more information about instructional strategies, along with an example of a TOPS Report conference.) Also keep in mind that the TOPS Report conference isn’t only a teaching opportunity; it’s also a chance to motivate. Start conferences with something positive about the students’ work and effort, and then move on to where the student struggled. For example, if a student multiplied correctly, but was supposed to divide, first acknowledge the correct product before pointing out the wrong operation. In this way, you’ll frame the TOPS Report conference as a chance for students to improve upon what they already know, letting them walk away with their dignity intact and improving the chances that they’ll be eager to return.

Establishing a Practice Cut Score for One-on-One Conferences

Establishing a practice cut score for one-on-one conferences can help you quickly sort who can continue working independently and who needs one-on-one attention. You could start with a rough measure—75 percent, for example—and let students who score 75 percent or above on practices continue with next assignments, and ask students who score below 75 percent to sign up for one-on-one conferences. Adjust the cut score to achieve a balance of students working independently and students getting help. As your implementation progresses, you’ll gain a sense of other factors to take into account when deciding who continues and who needs a conference, e.g., math content, motivation, and so on. Also keep in mind the features of Accelerated Math for Intervention that can help support such a system: TOPS Reports include correct answers for missed problems (unless you change the preference); resources in the classroom can help students address their misunderstandings; next assignments give students a chance to work more problems for an objective; and Accelerated Math flags objectives with an intervene symbol if students continue to struggle.
Use exercises, sample problems, and worked examples to support the reteaching of individual students or small groups. As we mentioned earlier, exercises are one of the assignment types that you can print to clear the intervene symbol from the Assignment Book and use for extra practice on an objective after providing additional instruction. You can also print exercises separately from clearing the intervene symbol. Exercises are truly versatile: you choose when to print them, which objectives to include, how many problems to include per objective, and, if printing for more than one student, whether the problems should be identical or individual. Because you can print the same exercise for more than one student, it might be ideal for reteaching the same objective to a small group.

<table>
<thead>
<tr>
<th>Practice</th>
<th>Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable students to become ready to test on objectives</td>
<td>• Teacher prints the first practice and then, going forward, the software prints automatically if objectives are eligible for practice, i.e., “assigned” or “ready to work”</td>
</tr>
<tr>
<td>• Teacher prints</td>
<td>• Teacher chooses any objectives</td>
</tr>
<tr>
<td>• Software includes objectives that are: assigned by the teacher, ready to work (via the student not meeting success on a diagnostic test or exercise), or ready to be reviewed</td>
<td>• Teacher determines the number of problems</td>
</tr>
<tr>
<td>• Teacher sets preference to predetermine size</td>
<td>• Teacher can print identical or individual exercises (if printing for more than one student)</td>
</tr>
<tr>
<td>• Each practice is unique: it’s based on the student’s previous work and objectives assigned by the teacher</td>
<td><strong>How can you use it?</strong></td>
</tr>
<tr>
<td></td>
<td>• Provide extra practice or review on specific objectives</td>
</tr>
<tr>
<td></td>
<td>• Print to clear the intervene symbol from the Assignment Book and provide students with an opportunity to become ready to test on objectives after receiving additional instruction on them</td>
</tr>
</tbody>
</table>

To print an exercise, go to the Assignment Book, choose a group if necessary, select the student or students, and click Print Exercise under Activities on the left. Then choose which objectives to include, enter the number of problems to include per objective, and click Print. If printing for more than one student, also select if the exercises should be identical or individual. When students score exercises, they will either become ready-to-test or ready-to-work on the included objectives, depending on whether they meet certain criteria in the software (five out of the last six problems correct). You’ll know if students meet the criteria by checking their TOPS Reports and by viewing the status symbols in the Assignment Book.
Sample Problems Can Support Reteaching

First, print from the software: (1) an exercise that includes at least six problems; and (2) the sample problems for an objective. The sample problems provide problems for you to work together with the student, leaving the exercise for independent practice. First, using the sample problems, model how to work the first problem. Then, have the student show you how to work the second problem. If successful, the student completes the exercise independently.

Sample problems and worked examples can also support your reteaching of an objective. (The sidebar explains one way that sample problems can help ensure that a student knows how to work problems for an objective before completing an exercise.) View sample problems by clicking the View Example icon to the right of an objective name in the software or by accessing the Library Guide that includes the objective (the appendix includes instructions on p. 152). View worked examples in the software by clicking the View Worked Example icon to the right of an objective name. Worked examples, available for objectives in the Accelerated Math Second-Edition Libraries, show how to solve a problem for an objective. They can support your reteaching and serve as a resource for students when independently working on assignments. You can also access sample problems and worked examples through the Learning Progressions for Instructional Planning; see Chapter 5 for more information.
Getting Started

Use the Accelerated Math Status of the Class Report for daily planning. The Status of the Class Report helps you monitor practice, plan instruction, and identify students who need extra help while working on objectives. It takes information from the Accelerated Math Assignment Book, consolidates it, and presents it in an easy-to-read format so you can quickly determine next steps. We recommend that you generate and view this report daily when planning for class. View the sample report on the next page as we go through each of its sections.

- **Assignment Status.** Skim the Action Needed column. Check if students need objectives assigned or work printed, e.g., practice or diagnostic test. Next, look at the Objectives Ready to Test column. If a student is ready to test on one or two objectives, print a regular test. Finally, look at the dates of when assignments were printed. Are any of the dates for more than a couple of days? If so, check in with students to find out why they haven’t scored their assignments.

- **Intervention Needed.** These students have one or more objectives flagged with an intervene symbol in the software. Plan on meeting with these students to provide additional instruction. Check the column that lists objectives by number and name. Are any students having trouble with the same objective? Can you pull them together for small-group instruction? Which students must you meet with individually? Print assignments to clear intervene symbols from the software, and to enable students to either master an objective (through completing a diagnostic test) or to become “ready to test” on it (through completing an exercise) after receiving additional instruction.

- **Objectives Causing Difficulties.** This category alerts you to opportunities for small-group instruction. It tracks objectives that, by default, three or more students are struggling with. If you choose two as the minimum number of students when generating the report, objectives that two or more students are struggling with will appear in this section.

- **Outstanding Assignments.** Check the dates to see if you need to follow up with any students.

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**Use Friday as Catch-Up Day**

Some teachers have students finish all outstanding work on Fridays. Those who don’t have outstanding assignments rotate to learning stations, work in cooperative groups of three or four, or perhaps participate in a special planned activity. The teachers also use this day to catch up: they meet one-on-one with any students remaining on their sign-up sheet, or with any students for whom they’ve printed assignments to support reteaching an objective. In a sense, Fridays are like the end of a quarter—everyone is up-to-date and starts fresh on Monday.
Incorporate the Status of the Class Report into your daily routine. View the report at the end of each day, and take the actions indicated to prepare you for the next class meeting. For example, put assignments that students will complete independently in their folders or binders so they will have them for the next day. By taking care of these tasks outside of class time, your attention can be focused on meeting with students during the class period. The appendix includes instructions for printing Accelerated Math reports on p. 152.

Monitor Development of Fact Fluency

Fact fluency development can involve many activities in your class: math fact practice with MathFacts in a Flash, warm-up and wrap-up activities, or number sense stations, just to name a few. Some of these activities may call for more formal monitoring than others. A simple checklist might suffice for quickly noting who’s on track during warm-up activities, but students might create specific artifacts at a number sense station as evidence of their work there. Think about the fact fluency activities that will take place in your class, and the appropriate level of monitoring for each of them. Later in the chapter, we’ll also suggest how students can monitor their own progress, taking some of the burden off of you and giving them a better sense of their progress. Here, we’ll look at the MathFacts in a Flash Class Progress Report as one way you can monitor work done in the MathFacts in a Flash software.

Use the MathFacts in a Flash Class Progress Report to monitor math fact practice. In the last chapter, we discussed how to get students started right away with practicing math facts with the Renaissance Responders. We also talked about how students can send their Responder practice data to Renaissance Place so it can be viewed on MathFacts in a Flash reports, including the Class Progress Report. The Class Progress Report provides a snapshot of all student work done in the MathFacts in a Flash software, as well as a summary of work done on the Renaissance Responders (or through Renaissance Home Connect, which we’ll discuss in the next chapter). In the next chapter, we’ll look at other MathFacts in Flash reports that help you monitor individual student progress. Here, we’ll stick with the big picture—practice from the class perspective.

View the sample Class Progress Report on the next page as we go through its two main sections: Current Level and All Levels. Keep in mind that these sections reflect work students have done in the MathFacts in a Flash software—while working on school computers—not work they’ve done with Renaissance Responders.

Viewing Data from Renaissance Responders on MathFacts in Flash Reports

You can view data from Renaissance Responders on key MathFacts in a Flash reports, such as the Class Progress Report and the Student Record Report. When generating the reports, be sure to include a Renaissance Responder practice summary under the customization options. Also keep in mind that students must first send Renaissance Responder data to Renaissance Place before you can view it on reports. The appendix includes instructions for printing reports on p. 146.
### Class: 1st Period Math

**Teacher:** Zimmer, Leslie

#### Current Level

<table>
<thead>
<tr>
<th>Student</th>
<th>Level</th>
<th>Last Session</th>
<th>Session Type</th>
<th>Number of Practices</th>
<th>Number of Tests</th>
<th>Number of Levels Mastered</th>
<th>Best Time Attempts</th>
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<tbody>
<tr>
<td>Stine, Edward</td>
<td>15</td>
<td>Revision</td>
<td>Test</td>
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<td>Breung, Lila</td>
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<td>Multiplication by 2, 3</td>
<td>Practice</td>
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<td>Demetry, Cheyanne</td>
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<td>Subtraction of 19</td>
<td>Practice</td>
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<td>Subtraction Review 1</td>
<td>Test</td>
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#### Class Summary

- **Number of Students:** 12

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<th>Number of Levels Mastered</th>
<th>Best Time Attempts</th>
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<tbody>
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<td>Average</td>
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### Renaissance Home Connect Practice Summary

**Number of Students:** 10

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<td>Total</td>
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**Students who did not use Renaissance Home Connect:** 2
- Gomez, Hector
- Stone, Heidi

### Renaissance Responder Practice Summary

**Number of Students:** 12

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<th>Number of Practices</th>
<th>Number of Tests</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
<td>713</td>
</tr>
</tbody>
</table>

**Students who did not send Renaissance Responder practice data:** 6

Mr. Frank has suggested that the Renaissance Home Connect and the Renaissance Responder may be due to the level of mastery. Individual student results for work using Renaissance Home Connect and the Renaissance Responder are available on the Student Record Report.
Go to the end of the report to view a Renaissance Responder Practice Summary that includes the total number of Responder practices and tests completed by the class, as well as a list of which students did not send Responder data to Renaissance Place during the reporting period you selected. For information about Renaissance Responder work at the student level, view the Student Record Report, which we’ll look at in the next chapter (see an example on p. 80).

**Current Level:** Which students need help with their current levels?

- *School Days Since Last Session.* Has it been several school days since a student completed a practice or test? If so, has the student been absent? Or perhaps the student has been using a Renaissance Responder to practice math facts.

- *Number of Tests.* Has a student taken five or more tests in a level without mastering it? If so, the student may need more practice to develop automaticity before testing again. Or the student may need more strategies or a stronger conceptual background for the level. Finally, the student may simply need to slow down enough to be more accurate. The Student Progress Report, discussed in the next chapter, can help you zero in on the cause of difficulty (see an example on p. 82).

**All Levels:** Who is generally struggling?

- *Levels Mastered.* Have any students mastered fewer levels during the report period than you might expect? If students are struggling with automaticity, take a step back and figure out the cause. Refer to the *Numeracy Development and Intervention Guide* for more information.

- *Number of Tests vs. Number of Levels Mastered.* Students who have taken many tests, but have mastered few levels, may be struggling with concepts. (The Student Record Report gives further details about how students mastered previous levels. You can also refer to the *Numeracy Development and Intervention Guide* for more information about how to provide support to students who are struggling.)

- *Best Time Attempts.* Students have a choice in the software to better their times on previously mastered levels. The numbers in this column reflect how many times students have lowered their mastery time of a level, including the initial successful attempt at mastery. For example, if a student mastered a level, but didn’t later attempt a better time on the level, the number shown will be 1.

**Set Goals**

Goals are powerful. A simple goal can transform a seemingly insurmountable task into a doable plan. Suddenly, the only thing between you and a new house is putting away an affordable monthly amount in the bank. Or the ambitious fitness plan begins to look achievable, given you begin by walking 30 minutes a day or taking the stairs instead of the elevator. Goals are meant to motivate. Without goals, we might hesitate to begin any challenging endeavor, no matter how worthwhile
it may be. For this reason, we recommend that you set goals for your students in Accelerated Math for Intervention.

Think about the kinds of goals that you’d like to set for, or with, your students at the beginning of your implementation. Goals influence behavior, so what kind of behavior do you want to promote? Getting students to remain on task throughout the class period might be a good place to start. If students are engaged, then they’re working toward improving their critical math skills and developing fact fluency. This effort will impact their overall math abilities. To capture the whole picture, we recommend that you initially set two types of goals: effort-based goals for work done in MathFacts in a Flash and Accelerated Math, and a goal for development of overall math ability, as measured by STAR Math.

Set effort-based goals for work done in MathFacts in a Flash. Your students will likely start at different levels in MathFacts in a Flash, each moving forward at an individual pace. What’s the best way to identify a standard level of effort in such a diverse setting? Think about time spent practicing with MathFacts in a Flash. This should be the same for each student—at least ten minutes a day, five days a week, or the equivalent. This goal is attainable by all students since they can practice independently with Renaissance Responders. Create a simple checklist to keep track of who meets their daily math fact practice goal. Or have students send Renaissance Responder practice data to Renaissance Place so you can view a summary of Responder practice on the MathFacts in a Flash Class Progress Report and check who did not send Renaissance Responder data for the day (see the example on p. 62).

Practicing at least ten minutes a day, five days a week, or the equivalent, will lead to students mastering levels. Students can track which levels they master by using a MathFacts in a Flash All-Level Mastery Tracker (see next page). Students keep the tracker in their materials folder or binder, highlighting or dating each level as they master it. For more detailed tracking of practices and tests, students can fill out the MathFacts in a Flash Practices and Tests Chart as they work to master a level (see next page). The chart helps students document how many times they practiced and tested on a level, the mode of practicing or testing, dates, and scores. This chart also helps you see at a glance if a student is struggling with a certain level. See the appendix for reproducible forms of the tracker and chart.

Set effort-based goals for work done in Accelerated Math. At the beginning of your Accelerated Math for Intervention implementation, set effort-based goals in Accelerated Math that allow for students to get accustomed to the software and to supporting routines. This could mean a weekly goal of students completing at least one practice and one test. Build in tracking of goals when you develop your real-time management system for Accelerated Math (discussed earlier in this chapter). If completing at least one practice and one test each week doesn’t seem to fit the pace of your students, or if you’re farther along in your implementation when setting the goal, then up the ante—perhaps to a weekly goal of at least two practices and two tests. Keep in mind that you play a role in students meeting their goals: you print tests for students and make sure that objectives are eligible for practice.
Completing a minimum number of assignments each week will lead to students mastering objectives. To help students keep track of mastered objectives, print an Accelerated Math Objective List Report for each student and have them keep the report in their Accelerated Math folder or binder. As students master objectives on diagnostic tests or regular tests, they highlight the objectives on the report and immediately see the results of their efforts.

**Set goals for development of overall math ability.** As students work toward developing fact fluency and mastering critical skills, they’ll also improve their overall math abilities. Gauge this overall growth by setting goals in the STAR Math software, and then periodically administer the test to measure students’ progress toward the goals.
To help you set goals in STAR Math, we provide a goal-setting tool within the software (referred to as a “wizard”) that is based on data we’ve collected on the math growth rates of over 330,000 students across the country. The wizard incorporates growth norms to help you calculate appropriate goals for students based on their individual STAR Math scores, and also records the important information about an intervention so it can appear on reports. For example, on the STAR Math Student Progress Monitoring Report, the software plots a student’s progress and projects whether or not the student will meet the goal that you’ve set so you can judge the effectiveness of the intervention (see an example on p. 84). For a more detailed explanation of how to set and monitor goals with STAR Math than the one that follows, see our publication *Getting the Most out of STAR Math*, which is available as a free download or for purchase as a spiral-bound copy through our Web site, www.renlearn.com.

**Set up an intervention and goal in the STAR Math software.** Take a look at the illustration of the STAR Math Goal Setting Wizard below as we outline the process of setting up an intervention and goal in the software. The numbers correspond to the steps described on the next page.
Step 1: Name the intervention and enter an end date. Under Intervention Details, enter the intervention name as you’d like it to appear on reports. This could be the name of a specific program such as “Accelerated Math for Intervention” or it could be a description like “pull-out math intervention, 60-min. daily.” The end date can be the end of a marking period, semester, or school year, or any other period of time. Just be sure to allow enough time for the intervention to work. Experts recommend no fewer than eight weeks. (Some states and districts specify a minimum of ten or twelve weeks.) If you are uncertain about how much time a student needs to meet a goal, make your best guess. You can change the goal end date at any time.

Step 2: Select a starting test. If the student has taken more than one STAR Math test before you set up an intervention in the software, select an anchor test. Use the Starting Test drop-down list to view the dates and results of all STAR Math tests the student has taken. Choose the testing date that is closest to the start of the intervention. If the student did not test within a week or two of the start of the intervention, consider retesting the student before setting up the intervention and establishing a goal in the software.

Step 3: Review the reference points. If you select a starting date that’s different than the initial one shown, the software refreshes reference data designed to help you set a goal for the student. In this example, Mark Boyle tested on 9/14/2009 and achieved a scaled score of 574, which placed him in the 15th percentile. The first reference point tells you the rate of growth necessary for him to hold his ground in relation to his peers. The second reference point tells you the growth rate needed to reach benchmark (40th percentile, by default) by the end of the school year. In this case, if Mark sustains a growth rate of 1.2 scaled scores per week he will remain in the 15th percentile at the end of the school year. To reach benchmark—the 40th percentile—he needs a growth rate of 4.1 scaled scores per week. In most cases, the goal you set will be between these two points. In some cases, it will take students in intervention more than one year to move to grade level or to proficiency levels defined by your district or state.

Step 4: Select the goal type. Underneath “Select a goal type” in our example, you’ll see two choices: Moderate and Ambitious. If you select “Moderate” and click Calculate Goal at the bottom of the screen, the software displays the minimum growth rate achieved by 50 percent of students who started the school year with a similar percentile rank as the student for whom you are setting goals. If you select “Ambitious,” the software displays the minimum growth rate achieved by 25 percent of students who started the school year with a similar percentile rank. Also displayed are the scaled scores and percentiles that would result from these growth rates.

If neither of these goals seems right, you can define a custom goal by entering a growth rate in scaled scores per week, or by entering the scaled score or percentile rank you want the student to achieve by the end of the intervention.
Teacher's Guide to Accelerated Math for Intervention

period. You could set a goal between the moderate and ambitious options, for example, if you thought that was more appropriate. Or if a student is within reach of the benchmark, you might want to set the goal at the benchmark level.

How do you know which goal is best? If you're new to all the components of Accelerated Math for Intervention, then you might initially choose moderate goals for your students, knowing that you'll need some time to fully implement the program. Then, when you're more comfortable with Accelerated Math for Intervention, you may feel more confident about setting ambitious goals for your students. Also consider what you know about each of your students when setting goals. What does the student's educational history indicate about motivation and desire to learn? What was the student's rate of learning up to this point? If a student has been unmotivated and frequently absent from school, or if the student has switched schools often, you might conclude that a moderate goal is most realistic. Conversely, you might decide that an ambitious goal is essential, especially if the student's needs are urgent and your intervention resources, e.g., time, staffing, and materials, are sufficient to the task.

Step 5: Save the information. Finally, don’t forget to click Save when you are satisfied with your choices.

Administer STAR Math periodically to students. We recommend that you administer STAR Math to your students at least once a month. This recommendation aligns with the guidance provided in the Institute of Education Sciences (IES) practice guide, Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools, and allows for a balance of capturing growth as it occurs while avoiding testing burnout.

Other factors may influence your decision of how often you administer STAR Math to your students, such as school or district mandates, scheduling, and the needs of students in intervention classes. If your school uses STAR Math for universal screening, then your students might already test at least twice a school year—in fall and spring. Your school might even administer STAR Math more often: for screening purposes in fall, winter, and spring, and to monitor the progress of students in intervention more frequently—monthly, biweekly, or even weekly. If your students will take part in district- or schoolwide STAR Math testing, plan additional testing dates, if necessary, to achieve testing on at least a monthly basis. After you decide on a testing schedule for your students, arrange for a testing location (either in the computer lab or in your classroom) and allow time for testing to take place within the class period.

Motivate Students When STAR Testing

Think about using the STAR Math Student Progress Monitoring Report with students to motivate them before testing. See an example on p. 84. Show students their progress so far, as well as the end goal (represented by the star). Make sure they understand that their job is to do their best on the test so they can reach the goal. Also try to print a new Student Progress Monitoring Report soon after students test so they can see how they did. Make sure that students have their eyes on the prize before testing, and know their test results soon after so they can immediately recognize their progress.
Getting Started Checklist

Build Foundation of Critical Skills

- Identify objectives for critical skills work by viewing students’ recommended libraries on the STAR Math Accelerated Math Library Report. Start students in libraries one level lower than the recommendation; or, if STAR Math recommends two libraries, choose the lower one.

- Decide how to manage differentiated practice in the Accelerated Math software: (1) use one comprehensive objective list for your whole class; or (2) create groups in your class Assignment Book and use an objective list for each of them. Take the appropriate next steps so each class or group has an assigned objective list.

- Print an Accelerated Math Objective List Report for each class or group.

- Meet with students to discuss their starting points.

- Print diagnostic tests and use them to find each student’s edge— the point on the objective list where a student’s success with objectives begins to diminish.

- When you find the edge, temporarily stop diagnostic testing and begin with practice.
  - Set the default practice size to small.
  - Print initial practice assignments for students.
  - Make sure that objectives are eligible for practice in the software (“assigned” or “ready to work”) so Accelerated Math automatically prints next practices.

- As students become ready to test on objectives, print regular tests that include one or two objectives.

- Shift between practice and diagnostic testing modes to efficiently target instruction for each student.

- Create a system for real-time management of student work, taking into consideration the general advice given in this chapter as well as the specific needs of you and your students.

- Teach or reinforce skills during TOPS Report conferences. (See Chapter 5 for more information about instructional strategies.)

- Use the Accelerated Math Status of the Class Report for daily planning.

Monitor Development of Fact Fluency

- Use the MathFacts in a Flash Class Progress Report to monitor practice.
  - Check how often students have practiced or tested.
  - Determine if a student is struggling with a level.

Set Goals

- Set daily or weekly effort-based goals for work done in MathFacts in a Flash and Accelerated Math, and develop a system for monitoring them.

- Set goals for development of overall math ability, as measured by STAR Math.
  - Set goals in the STAR Math software.
  - Administer STAR Math to your students at least once a month.
**Summary**

- Getting started with your implementation of Accelerated Math for Intervention involves taking the next steps with critical skills work and development of fact fluency, as well as setting initial goals for students.
- To help students begin to build their foundations of critical skills, identify objectives for critical skills work, perform a few tasks in the Accelerated Math software, use diagnostic testing to find each student’s edge, and establish additional routines for you and your students.
- Shift between diagnostic testing and practice modes to efficiently target instruction as you move forward with critical skills work.
- Use the MathFacts in a Flash Class Progress Report to monitor the big picture of students’ math fact practice.
- Students can send a record of their Renaissance Responder practice to Renaissance Place so you can view it on key MathFacts in a Flash reports.
- At the beginning of your implementation, set two types of goals for students: effort-based goals with Accelerated Math and MathFacts in a Flash, and a goal for development of overall math ability in STAR Math.
- Build in tracking of effort-based goals in your real-time class management system, and also provide students with tools for self-monitoring their goals.
- Set goals for development of overall math ability in the STAR Math software, and plan to administer STAR Math to your students at least once a month to measure progress toward the goals.
Chapter 4
Ongoing Monitoring

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Ongoing Monitoring

Your recipe is finally coming together—what was once a lot of ingredients has transformed into a main course. It’s time to take a taste. Are you ready to plate the dish or does it need some finishing touches? Similarly, with Accelerated Math for Intervention, it’s time to take a step back to evaluate your implementation so far. You’ve spent time incorporating all of the essential components: establishing routines, getting students started with fact fluency and critical skills work, and setting goals. How are things coming together? Do you need to make any adjustments? To help you answer these questions, we look at reports in this chapter that can assist with your ongoing monitoring of students’ fact fluency and critical skills work. We also suggest how you can monitor goals and check in with students about their individual progress. To start, we explore a few topics for you to consider now that you’re further along in your implementation of Accelerated Math for Intervention.

As Your Implementation Progresses...

As the school year progresses, take a moment to think about how you can sustain or deepen your implementation of Accelerated Math for Intervention. As part of this process, be sure to evaluate your routines and learning stations, as well as how you can extend practice outside of school.

Evaluate routines. We’ve emphasized all along that effective routines are essential to a successful implementation of Accelerated Math for Intervention. You might have even spent several weeks up front establishing your classroom routines by teaching them, giving students time to practice them, and reteaching them as needed. If so, that was definitely time well spent. However, be prepared to spend even more time with routines as the school year progresses. You’ve set them up, but now they’ll require maintenance.

Spend some time evaluating the routines in your classroom, or, better yet, ask a colleague to observe your class and make notes for you. Consider the following as you analyze your routines:

Partnering with a Colleague to Observe Routines

If you partner with a colleague for observing classroom routines, make sure you’re both clear about the purpose of the observations and perhaps agree upon a checklist or set of questions to complete during them. For example, you might ask the observer simply to gather information for you by tracking the time and noting every few minutes where students are and what they are doing, and where you are and what you are doing. You could even videotape each other, if possible, instead of taking written notes.
• Are students physically where they should be throughout the class period? Is any time wasted during transitions?
• Do any routines take students off task?
• Do you spend a lot of class time directing students? If so, can additional supports help students become more independent?
• Do you need to revise posted procedures? Should you create any new ones?

If a routine isn’t fulfilling its intended purpose, resist changing the routine right away. First determine the root of the problem. If students are simply forgetting what to do, reteach the routine and give students time to practice. Also post a visual to remind them of the steps going forward. On the other hand, if you decide that a routine is ineffective, think about replacing it altogether. Even though it’s difficult to switch gears in the middle of a school year, it may be worthwhile if the faulty routine is taking students off task. For example, suppose you’ve asked students to rework missed practice problems before they meet with you for TOPS Report conferences, but you find they rarely do. You may need to add more structure: perhaps a protocol to help them consult worked examples, make notes on the steps, and then rework the problem or jot down notes about what they’re unsure of.

Evaluate learning stations. If you have learning stations in your classroom, then you probably set them up at the beginning of the school year. That way, students could become comfortable with using the stations, and you could use them to help control workflow in the classroom. However, at the beginning of the school year, you probably were new to Accelerated Math for Intervention, or at least to some of its components. This might have caused you to scale back what took place at the stations. Now that you’re more comfortable with Accelerated Math for Intervention, consider whether your stations are meeting the needs of your students.

• Are the stations working well? Are students making gains in fact fluency and skills development? If so, you could leave the stations “as is” for the time being.
• Are students finishing activities quickly at the stations? Are they returning to you to find out what to do next? If this is the case, then you could make some changes. You might expand the use of a number sense station to include additional activities, such as those found in the Numeracy Development and Intervention Guide. Or a math facts station could accommodate some partner work, including practicing math facts with flash cards.

Overall, keep in mind that once the routines surrounding stations are firmly established, their related activities can evolve throughout the school year.

Extend math practice outside of school. Renaissance Home Connect is a great tool for extending student math practice outside of school and for involving parents in their child’s work. From any Web-enabled computer, students can practice math facts and possibly score Accelerated Math assignments (if you set a preference), and parents can access their child’s practice data for MathFacts in a Flash and
Accelerated Math. Renaissance Home Connect also allows students to have email results sent to parents or guardians upon completion of an Accelerated Math test or MathFacts in a Flash level at school.

When working with MathFacts in a Flash in Renaissance Home Connect, students can:

- View the results of their last session at school and at home, as well as incorrect problems from the session.
- Choose any level to practice.
- Choose to test on any level (but successfully completing a test won’t count toward actual mastery in the MathFacts in a Flash software).
- Share progress with parents.

Students must log into Renaissance Place and use MathFacts in a Flash at least once at school before they can practice or test in MathFacts in a Flash at home.

When working with Accelerated Math in Renaissance Home Connect, students can:

- View progress on recent assignments.
- See how many objectives they’ve mastered in total.
- Score practices and exercises (if you set a preference), and print TOPS Reports and next practices.
- Reprint practices or exercises.
• Access a math glossary, as well as worked examples for objectives included on current or past assignments. (Parents might also find that the math glossary and worked examples help them better understand the objectives being taught and practiced at school.)

• Share progress with parents.

If students score assignments from home, they’ll fill in an onscreen scan card to submit their answers. If you disable scoring from home for a class, students can still access their achievement information to share with parents.

**Setting up Renaissance Home Connect.** Before your students and their parents can begin using Renaissance Home Connect, a district administrator must set up the program and activate it for schools. Once activated, you can print an informational letter from the Renaissance Home Connect tab in Renaissance Place for your students to take home. Each letter includes information about accessing Renaissance Home Connect, including the Web address (URL) and the student’s user name and password. Parents will also use their child’s user name and password to access Renaissance Home Connect. Additional information about Renaissance Home Connect can be found under its tab in Renaissance Place.

**Using Renaissance Home Connect with your students.** When you distribute informational letters to students so they and their parents can access Renaissance Home Connect, be sure to explain the program and provide guidance for how to use it.

*Viewing Data from Renaissance Home Connect on MathFacts in Flash Reports*

You can view data from Renaissance Home Connect on key MathFacts in a Flash reports, such as the Student Record Report and the Class Progress Report. When generating the report, be sure to include a Renaissance Home Connect practice summary under the customization options. Also keep in mind that students must work in the MathFacts in a Flash software at school at least once before they can work with MathFacts in a Flash through Renaissance Home Connect.

For example, when working in MathFacts in a Flash, students will likely work on their current school level, but may also spend time either reviewing mastered levels to improve their fluency or challenging themselves to practice new levels. It’s fine to encourage practice at all levels—students feel empowered and become invested in their own learning when they can make choices about what to practice. At the same time, students can expect to find it more difficult to develop automaticity with math facts that are beyond their content knowledge. It’s important to remind students (and their parents) that they should work toward automaticity of known content so they don’t get discouraged. Also let parents know which levels or range of levels you feel are most appropriate for their child to practice at home.

For Accelerated Math, decide whether you want students to score practices and exercises through Renaissance Home Connect and then set the preference in the Accelerated Math software (the appendix includes instructions on p. 153). If
allowing scoring, be sure to explain your expectations to students and establish any necessary routines, e.g., students must show work for assignments completed and scored at home. Accelerated Math treats work scored through Renaissance Home Connect like work scored at school. In other words, when students score work through Renaissance Home Connect, they’ll receive TOPS Reports (and possibly next practices) which they can print or save to their computers. You can view results of assignments scored through Renaissance Home Connect from the Assignment Book on your computer, including students’ TOPS Reports by selecting a student and then clicking Reprint TOPS for the recent assignment in question. Regardless of the scoring preference you set, students and parents can take advantage of the worked examples and math glossary in Renaissance Home Connect when working with math objectives at home.

Continue to Help Students Build a Solid Foundation of Skills

Students are now practicing, testing on, and reviewing objectives to reinforce and build upon their skill foundations. You’re meeting one-on-one with students to address misunderstandings and reinforce concepts. You’re also using diagnostic tests, as needed, to further pinpoint critical skills gaps as students advance through their assigned objective lists. All of this in itself creates a robust learning environment where students are fully supported in working toward grade-level objectives. To further assist you and your students in this endeavor, we’ll look at a report that can help you quickly gauge your students’ overall quantity and quality of skills work.

Review the Accelerated Math Diagnostic Report to check overall progress.

The Accelerated Math Diagnostic Report, as shown on p. 78, summarizes how many objectives students have mastered, indicates if they mastered them via a regular test or a diagnostic test, and lists average percent correct averages for the four assignment types, as well as review objectives. We recommend that you view this report weekly, focusing on a few pieces of data: the number of objectives mastered on regular tests vs. diagnostic tests, and the average percent correct for practices, regular tests, and review.

If a student has a high number of objectives mastered on diagnostic tests, especially as compared to regular tests, it might be due to being in the diagnostic

**Students with a “P” Code**

If students struggle with practices, then they’re having difficulty with some of the concepts, principles, and procedures associated with the objectives they’re working on. Accelerated Math for Intervention includes Learning Progressions for Instructional Planning that can help you remediate instruction for these students. Use the Learning Progressions to see concepts associated with each of the Accelerated Math core objectives, a list of prerequisite skills, and where each core objective sits in the learning progression—both within a grade, and from grade to grade. You can also print sample problems and worked examples from the Learning Progressions to support your reteaching of an objective. Chapter 5 includes more information about Accelerated Math’s Learning Progressions for Instructional Planning.
testing stage and doing well. However, if the high number carries over from week to week, then the student might be working in a library, or with a set of objectives, that is already understood. Consider printing the student's next diagnostic test for objectives further on the objective list to see if you can find a gap, or have the student work with objectives that are at a higher grade level.

Average-percent-correct data alerts you to students who are struggling. If students' averages fall below 75 percent on practices, 85 percent on regular tests, or 80 percent on review, they're unlikely to master, or retain understanding of, many objectives. The Accelerated Math Diagnostic Report uses codes to flag students having difficulty meeting these percentages: “P” for practice, “T” for regular test, and “R” for review. For example, if a student's practice average falls below 75 percent, you'll see a “P” next to the student's name. The intervene symbol is another of the diagnostic codes, and simply means that a student has an objective flagged for intervention in the software. The final code, “M,” means the student is well below the class median of objectives mastered.
Support Development of Fact Fluency

When developing fact fluency, students are striving for the goal of automaticity. We discussed how automaticity with math facts—knowing math facts without having to think about them—frees up students’ working memory so they can tackle more complex problem solving. The MathFacts in a Flash software provides the means to assess this developing automaticity and lets you and your students monitor progress toward that ultimate goal.

We’ve mentioned a variety of ways that students can develop, or become prepared to develop, fact fluency in your implementation of Accelerated Math for Intervention: math fact practice with MathFacts in a Flash, warm-up/wrap-up exercises, and math fact or number sense activities at learning stations. We also talked about how these activities might require different degrees of monitoring by you and by your students. For math fact practice with MathFacts in a Flash, we looked at the Class Progress Report and how it gives a snapshot of overall math fact practice. In this section, we’ll see how you can go a step further and monitor practice at the student level by using a couple of other reports in MathFacts in a Flash: the Student Record Report and the Student Progress Report.

Use the MathFacts in a Flash Student Record Report to view more detail about individual student work. The Student Record Report provides a detailed summary of a student’s current level, mastered levels, work done in Renaissance Home Connect, and work done with a Renaissance Responder.

View the sample report on p. 80 as you consider the following:

- **Current Level.** This section gives detailed information about the level the student is currently working on in the software. Check the student’s number of tests on the current level to make sure that it’s not too high. If it is, look at the time and accuracy data to see if the student needs to practice more before testing again, or just needs to slow down. Keep in mind that this section reflects work done in the MathFacts in a Flash software; it does not reflect work done in Renaissance Home Connect or with a Renaissance Responder.

- **Levels Mastered.** This section summarizes information about all levels mastered by the student. If you encourage your students to better their times by retesting, check the Best Time and Best Time Attempts columns. Has the student made a reasonable number of best time attempts? If not, check to see why the student is choosing to advance to the next level rather than attempting to achieve a better time on the current one. Like the Current Level section, this section reflects work done in the MathFacts in a Flash software; it does not reflect work done in Renaissance Home Connect or with a Renaissance Responder.

- **Renaissance Home Connect and Renaissance Responder Practice Summaries.** View the summaries to see how often and at which levels the student is practicing in Renaissance Home Connect or with a Renaissance Responder. Is the student practicing enough? Is the student choosing appropriate levels...
## Student Record Report

### Levels Mastered

<table>
<thead>
<tr>
<th>Level</th>
<th>Start Date</th>
<th>Date Mastered</th>
<th>Mastery Time</th>
<th>School Days To Master</th>
<th>Number of Practices</th>
<th>Number of Tests</th>
<th>Date of Best Time</th>
<th>Best Time</th>
<th>Date of Best Time Attempts</th>
<th>Best Time Attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Addition of 1</td>
<td>8/29/10</td>
<td>8/29/10</td>
<td>2.00</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>8/29/10</td>
<td>1.00</td>
<td>8/29/10</td>
<td>1</td>
</tr>
<tr>
<td>2. Addition of 2</td>
<td>8/29/10</td>
<td>8/29/10</td>
<td>2.00</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>8/29/10</td>
<td>1.00</td>
<td>8/29/10</td>
<td>1</td>
</tr>
<tr>
<td>3. Addition of 3</td>
<td>8/29/10</td>
<td>8/29/10</td>
<td>2.00</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>8/29/10</td>
<td>1.00</td>
<td>8/29/10</td>
<td>1</td>
</tr>
<tr>
<td>4. Addition of 4</td>
<td>8/29/10</td>
<td>8/29/10</td>
<td>2.00</td>
<td>3</td>
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### Summary

- Total Levels Mastered: 22
- Average Days to Master: 1
- Average Number of Practices: 1
- Average Number of Tests: 1

### Renaissance Home Connect Practice

Practices and tests taken using Renaissance Home Connect do not count toward level mastery.

### Renaissance Responder Practice

Practices and tests taken using the Renaissance Responder do not count toward level mastery.
for practice? Do you see a high number of tests taken? If the student is testing frequently in Renaissance Home Connect or with a Renaissance Responder, it could mean the student is preparing to test for mastery on a school computer.

Use the MathFacts in a Flash Student Progress Report to view progress, both on a current testing level and throughout the school year. The Student Progress Report shows a student's time and accuracy progress for the current level—if the student is currently testing—and provides a picture of overall progress throughout the school year. If you use MathFacts in a Flash benchmarks with your students, you can also see how students are progressing toward the benchmark.

The MathFacts in a Flash Student Progress Report (see an example on p. 82) helps you answer the following:

- How does the student's accuracy compare to time when testing? Does the student need to work on accuracy, speed, or both? If so, work with the student to develop a strategy for testing going forward.
- If using benchmarks, is the student on track to meet the grade-level benchmark by the target date? If not, provide additional support to the student for the development of automaticity with math facts.
- When did the student master each level, and what was the best time for the level? Did the student master many levels in a short span of time, and now is struggling at the

Provide Additional Support to Students Struggling with Automaticity

If a student is practicing and testing for automaticity at a given level in MathFacts in a Flash and struggling to achieve it, you may need to remediate instruction for the student. First have the student stop working in MathFacts in a Flash to avoid frustration. Then meet one-on-one with the student to discuss the problem and find out where fluency breaks down. For example, the student may need more practice to link the facts they know and build on them. The Numeracy Development and Intervention Guide describes, in detail and with examples, how to move students toward automaticity through varied practice and instruction as needed.

Using Benchmarks in MathFacts in a Flash

MathFacts in a Flash enables you to monitor student progress toward end-of-the-year benchmarks to help identify which students are meeting grade-level expectations for fact fluency. The software includes default benchmarks and a default target date (April 1) for meeting those benchmarks. School or district administrators can change the default benchmark settings to align with local standards or curriculum. You can view the default benchmark settings in the MathFacts in a Flash software (see the appendix on p. 147 for instructions).
Ongoing Monitoring

current level? If so, you may have found the student's edge with math facts. Consider providing additional instruction to develop the student's conceptual understanding of the current operation, or to develop additional strategies for recalling math facts.

- Is the student working at an appropriate pace, given the student's ability and applicable benchmarks or goals you may have set independent of the software? If not, meet with the student one-on-one to evaluate the problem and possibly adjust the end goal.

**Monitor Goals**

In the last chapter, we discussed setting two types of goals for students: effort-based goals (for work done in MathFacts in a Flash and Accelerated Math) and a goal for development of overall math ability (in STAR Math). These two types of goals complement each other well. Effort-based goals promote engagement, which leads to students doing more work; doing more work promotes development of fact fluency and critical skills, which leads to growth in overall math ability. In other words, because you are recognizing the amount of work students do in MathFacts in a Flash and Accelerated Math, students will do more of the work. That work will lead to gains in overall math ability. Let's now look at how you can monitor both types of goals to make sure that students are on track.

**Monitor goals for development of overall math ability.** In the last chapter, we walked through the steps for setting up an intervention and goal in the STAR Math software for each of your students. We also discussed administering STAR Math periodically to collect test data in order to gauge students’ progress toward their goals. The STAR Math Student Progress Monitoring Report displays the test results in an easy-to-read fashion, and helps you determine if students are responding well to your implementation of Accelerated Math for Intervention.

**Interpreting the STAR Math Student Progress Monitoring Report.** The first page of the Student Progress Monitoring Report displays progress data graphically for an individual student. If you look at the example on p. 84, you’ll see blue diamonds scattered across the graph. These represent each test the student has taken by date (horizontal axis) and scaled score (vertical axis). Scaled scores are like inches or pounds and are the best way to measure absolute growth over time. For example, if a child’s height changes from 51 inches to 53 inches, you know she has grown. However, this absolute growth—how many inches the child has grown—doesn’t answer the question, “So how much do children like this usually grow?” Similarly, you know a student’s math ability has grown if her STAR Math scaled score changes from 350 to 375, but you don’t know how that absolute growth compares to the growth one might expect of students similar to her. Comparative or relative growth is addressed in other parts of the report (described below), which show the growth rate goal you’ve set for the student compared to the student’s actual growth rate at a point in the intervention.
Smith, Avery
Grade 8
Class: Math Concepts 8
ID: AS234687
Teacher: Reede, M.

Avery's Current Goal
Goal: 741 SS (Moderate)  Goal End Date: 5/25/2011  Expected Growth Rate: 1.3 SS/Week

Avery's Progress

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Student Progress Monitoring Report
School: Lincoln Middle School
Reporting Period: 9/1/2010-6/30/2011
(School Year)

Avery's Current Goal
Goal: 741 SS (Moderate)  Goal End Date: 5/25/2011  Expected Growth Rate: 1.3 SS/Week
Now take a look at the vertical red line on the report. This marks the starting test for the intervention. You’ll see in this example that Avery’s STAR Math score at the start of the intervention was 701. Now notice the gold star on the right side of the graph. This represents the STAR Math score Avery will achieve by the end of the intervention if he meets the growth-rate goal his teacher entered in the software: 1.3 scaled scores per week. The green line connects the goal star with the starting point, i.e., Avery’s STAR Math score at the beginning of the intervention. We call this green line the “goal line.” The goal line’s slope is defined by the growth-rate goal, and it represents the achievement path the teacher wants to see Avery take during the intervention.

Next notice the black line. This is called the trend line. The software looks at a student’s test results and projects the student’s growth into the future. It displays this line to show you how the student’s progress is trending. By comparing the goal line to the trend line, you can see at a glance if a student is on track to reach the goal. A trend line appears after five tests are taken, beginning with the start of an intervention. Statistically, this is the minimum number of tests needed to report a trend with confidence. In this case, Avery’s STAR scores have gone up and down (see the sidebar) but his trend line has intersected his goal line and is climbing, which suggests he will exceed the growth represented by the gold star. The second page of the report shows the student’s current goal and actual test data. A growth rate is reported after five tests. In this example, Avery’s growth rate is 2.0 scaled scores per week, which exceeds his growth-rate goal of 1.3 scaled scores per week.

Once displayed, the trend line typically changes with every subsequent test. If you’ve ever been on a savings plan, you may have experienced this yourself. Suppose, for example, you start saving in September and set a goal to put aside a thousand dollars by June at a rate of $25 a week. You stick to your plan just fine for the first few months. The exact amount actually varies a bit from week to week, but since you are consistently adding to your savings account, the general trend is upward. Then you hit a savings slump, and for a number of weeks, you put less than $25 into your piggy bank. Consequently, your trend line adjusts to reflect the lower rate of dollars per week you put into savings. It even looks like you won’t meet your savings goal. But a few weeks later you get back on track and start saving more dollars every week. Your trend line adjusts once more to reflect your increased rate of savings. A student’s growth rate and trend line in STAR Math will show similar

---

**Why STAR Scores Go Up and Down**

When a test is administered frequently, an individual’s score often fluctuates. This may be due to the test’s standard error of measurement; student anxiety, illness, motivation, or level of attention; or a statistical phenomenon called regression to the mean. Regression to the mean is the tendency of those with the highest scores on an initial test to score closer to average on a second test, and those with the lowest scores to score closer to average—and therefore higher—on the second test. These factors do not make a test unreliable or invalid. But because some fluctuation is likely, a trend line is a better indicator of growth and projected growth than scores from individual tests.
fluctuations. After each test, the software recalculates these measurements so that you get the best, most current information.

**Responding to the data.** STAR Math data can tell you if a student is responding to intervention, but you must respond to the data in order for it to have value. Certain scenarios are likely to emerge. First, a student may be on track to meet the goal. Does this mean the student is ready to move out of your intervention class? There is no standard answer to this. You must consider the student and all the information you have about the student's math ability and self-efficacy (e.g., from class work, general education teachers, and other standardized tests). The trend line only indicates if a student is on track to meet a goal. This means the intervention has been successful so far. What the trend line can’t tell you is whether or not the student needs to stay in the intervention in order to actually meet the goal. That’s a matter of professional judgment. Now for the second scenario: a student is not on track to meet the goal. This situation also calls for analysis. Sometimes when students in intervention do not improve we conclude they must need more intensive intervention. This can be true, but other factors must be considered.

- Was the intervention implemented with fidelity?
- Are the strategies you’re using with this particular student on target? Sometimes an intervention needs to be modified in relatively minor ways to meet the needs of an individual.
- Has the student been in the intervention long enough for progress to become apparent? Many experts believe that a math intervention must be at least eight weeks long before you can tell whether it is working. Some students, perhaps because of the nature or severity of their difficulties, may require longer periods.
- Do you really understand the source of the student’s difficulties? When a student does not show progress, you may need to gather more diagnostic information. Perhaps, for example, what appears to be a difficulty with computation is really a reading problem or a deeper misunderstanding of a core concept.

**Editing an intervention and goal in the software.** If you decide to change the intervention duration or goal type for any of your students, be sure to edit the information in the software (see p. 143 in the appendix for instructions). That way, the most current information can be displayed on the STAR Math Student Progress Monitoring Report.

**Monitor effort-based goals.** In the last chapter, we mentioned that monitoring effort-based goals in Accelerated Math and MathFacts in a Flash will largely depend on the routines you put into place. To help you with this task, let’s look at a few ideas.

- **Effort-based goals in Accelerated Math.** We previously suggested that you require students to complete a certain number of Accelerated Math assignments each week: for example, one practice and one test to start, and then upping the ante as the school year progresses. Track the total number of completed assignments as part of your real-time management of student work in Accelerated Math. Or have students take on the responsibility of tracking their
number of completed assignments using a tracking sheet that you provide. If students find that they’re in danger of not meeting their weekly goals, they can sign up for a one-on-one conference with you to make a plan.

- **Effort-based goals in MathFacts in a Flash.** If following our recommendations, you likely require that students spend at least 10 minutes a day, five days a week (or the equivalent) practicing math facts. If students do much of this practice on the Renaissance Responders, you can monitor the goal by having students send Renaissance Responder data to Renaissance Place at the end of each class period. Then, generate the MathFacts in a Flash Class Progress Report (see a sample on p. 62), selecting the current day as the reporting period and including “students without data” under the customization options. Use the report to check that all students submitted Renaissance Responder data. If a question arises about individual student work, view the MathFacts in a Flash Student Record Report for more detailed information (see a sample on p. 80). The appendix includes instructions for printing reports on p. 146.

**Summary**

- Take steps to support your implementation of Accelerated Math for Intervention by evaluating classroom routines and learning stations, as well as extending math practice outside of school with Renaissance Home Connect.

- View practice summaries for work done in Renaissance Home Connect on two key MathFacts in a Flash reports: the Class Progress Report and the Student Record Report.

- Review the Accelerated Math Diagnostic Report weekly to gauge the overall quantity and quality of students’ skills work.

- To monitor practice in MathFacts in a Flash at the student level, view the Student Record Report and the Student Progress Report.

- Track students’ progress toward their goals for development of overall math ability using the STAR Math Student Progress Monitoring Report.

- A combination of checklists, student tracking sheets, and reports from the software can help you monitor effort-based goals for work done in Accelerated Math and MathFacts in a Flash.
Chapter 5

Instructional Strategies and Tools

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When it comes to gauging the need for instruction and practice, Accelerated Math for Intervention acts like a global positioning system (GPS), helping you to see where your students are at every step of the way. The tools of the program also allow you to identify any roadblocks that lie ahead so you can adjust accordingly before sending students farther down the path. For instance, when a student completes an Accelerated Math assignment, a TOPS Report provides immediate feedback on how the student did. At this point—or soon thereafter—you will hold individual conferences with some of your students based on that feedback. If the student is heading off-course, you can see exactly where he strayed from the path and you can “recalculate” to lead him back. Certain tools within the Accelerated Math software, such as Learning Progressions for Instructional Planning and the math glossary, which we’ll discuss later in this chapter, can provide additional guidance for your instruction during the conference. Following the conference, Accelerated Math helps keep the student on course by providing further practice, and by continuing to generate feedback on that practice. This system allows you to determine on a continuous basis when you need to instruct or reteach, and whether your instruction is effective.

The same metaphor applies to the other components of the program. Both MathFacts in a Flash on classroom computers and math fact practice on Renaissance Responders provide immediate feedback and assessment data for you and your students. This data acts like a guided map, giving you valuable information about which students are successfully heading down the path of developing automaticity with math facts and which students need additional instruction before going further. For instance, some students may need more numeracy development to help them understand the operations and the relationships among them. Even the 2Know! Toolbar, part of the 2Know! classroom response system, can provide insight into how many of your students may need additional instruction before they can arrive at their destination of automaticity with math facts.

Accelerated Math for Intervention, then, informs your teaching in many valuable ways. It does not, however, do the teaching for you. Instead, you’ll draw from a number of effective instructional strategies and utilize the tools of the program to best suit your students’ instructional needs. This chapter provides general guidelines for instruction within Accelerated Math for Intervention, first by giving a brief overview of research-based instructional strategies proven to be effective with struggling math students, and then by giving some suggestions about using these core strategies within the program. We will also look at an example of a TOPS Report conference and discuss how several instructional tools and resources included in the program can assist with your teaching.
While many of the research-based recommendations covered in this chapter may be familiar to you, they do bear repeating because they are essential principles of effective mathematics instruction. Of course, there are promising strategies that haven’t yet been the focus of a research project, so the advice given in this chapter isn’t exhaustive. It does, however, provide a solid foundation from which to build.

**Research-Based Approaches: Teach for Understanding**

Many reliable sources provide instructional guidance for working with students who have difficulties with mathematics. The National Council of Teachers of Mathematics (NCTM) examined more than fifty studies and summarized the most effective evidence-based practices in a research brief (Gersten & Clarke, 2007). The National Mathematics Advisory Panel (2008) conducted a systematic and rigorous review of scientific research on mathematics education and included concrete recommendations on instructional practices in its final report. The What Works Clearinghouse issued recommendations in an Institute of Education Sciences (IES) practice guide for assisting elementary and middle school students struggling with mathematics within a Response to Intervention (RTI) framework (Gersten et al., 2009). And the Center on Instruction identified seven effective instructional practices for teaching K-12 students with learning disabilities or difficulty learning mathematics (Jayanthi, Gersten, & Baker, 2008). These are just a few of the helpful resources available to teachers.

As expected, much of the advice in these publications overlaps. Yet one key principle is consistent throughout: always teach for understanding. Simply put, even if you teach a rule, make sure the student understands it, and teach for understanding before you focus on procedural knowledge. This means only teaching students shortcuts if you can explain what they mean mathematically. It also means encouraging students to think conceptually about problems; for instance, you might ask your students to paraphrase a problem by putting it into their own words or to attempt a rough estimate of the answer before attempting to solve a problem (Montague, 2005). These strategies help students use logical reasoning to think through what the problem is asking and what approach is needed to solve it. Below are some other key instructional strategies to help ensure that you are teaching for understanding.

**Use explicit and systematic instruction, and encourage students to think aloud.**

“Instruction during the intervention should be explicit and systematic,” notes the IES practice guide (Gersten et al., 2009, p. 21). “This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.” The NCTM research brief also recommends that teachers use systematic, explicit instruction to provide models of steps and procedures to follow or questions to ask in solving problems (Gersten & Clarke, 2007). Yet you do not need to use explicit instruction all of the time. In fact, the National Mathematics Advisory Panel (2008) notes that it’s important to balance explicit instruction with open-ended approaches. This ensures that you can meet the needs of a variety of learners and provide scaffolding to support student success.
One way to complement your use of explicit instruction is to encourage students to think aloud as they work through a problem with you. These “think-alouds” can help combat the impulse of students to randomly combine numbers or use a rote procedure without understanding rather than using a specific solution strategy step by step (Gersten & Clarke, 2007). With this approach, students are encouraged to make their thinking visible by talking, drawing, or writing the steps they used to solve the problem.

The Accelerated Math for Intervention TOPS Report conference is an excellent opportunity to put these methods into practice. You’ll have opportunities to model strategies and methods by verbalizing your own thought processes. You can also ask students to verbalize their thinking to help you diagnose errors and to confirm understanding. This might involve asking students to draw diagrams and to talk through the steps they took to solve problems. We’ll take a look at these strategies in action later in this chapter when we look at a sample TOPS Report conference.

**Use visual representations and manipulatives.** In order to assist students with understanding the underlying concepts involved in solving a problem, the IES practice guide recommends including “opportunities for students to work with visual representations of mathematical ideas” (Gersten et al., 2009, p. 30). The NCTM research brief also urges teachers to provide guidance on the use of graphics and visual organizers and to allow students to practice with them (Gersten & Clarke, 2007).

In addition, the NCTM authors recommend using an approach called “concrete-representation-abstract” (C-R-A) when students are having difficulties, for example, with problems involving fractions and basic algebra (Gersten & Clarke, 2007). Working with manipulatives gives students a framework in their working memory that lets them move to visual representations, which are a more efficient way to represent and solve problems. From there, students are able to move to the most efficient level of representation: the abstract language of mathematics. Since each level relies on the understandings built at the preceding level, touching base at the preceding level can have a payoff when students struggle. The NCTM authors recommend including some work with manipulatives for this group even in middle school and high school. The IES practice guide suggests using manipulatives more extensively in the lower elementary grades and using them more expeditiously in upper grades, i.e., when visual representations do not seem sufficient in helping students understand the abstract concepts (Gersten et al., 2009).

These methods can be used in multiple ways within Accelerated Math for Intervention. The *Numeracy Development and Intervention Guide* provides various examples of using the C-R-A approach, including protocols and activities that help students’ numeracy development through the use of manipulatives and visuals (Vos, 2009). Students learn best, explains Vos, when they first use hands-on materials, then engage with the concept in pictorial mode, and finally work with the concept in the abstract mode. In other words: “Touch it. See it. Think it.” This guide, which we’ll discuss in more detail later in the chapter, also includes several reproducible forms to aid in your teaching.
Concrete-Representation-Abstract Approach

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<td><strong>C</strong></td>
<td>Manipulatives</td>
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<td><strong>R</strong></td>
<td>Visual representations</td>
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<td><strong>A</strong></td>
<td>Symbolic representations</td>
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Examples include chips of different colors, number cubes, fraction strips, number pieces, math balance devices with weights, toothpicks or wooden sticks, and base-ten blocks.

Examples include circles, dots, tallies, number lines, diagrams, and graphs.

Examples include numbers, notation, and mathematical symbols.

One example of the C-R-A approach involves teaching the addition of two 2-digit whole numbers. To ensure the student understands the underlying concepts involved, you might use a “ten frame” to help illustrate the regrouping concept. A ten frame is a graphic organizer that is divided into ten equal spaces. There is a place within each space for a dot. A ten frame with all ten dots filled in represents a group of ten. A ten frame with, for instance, only six dots filled in represents six ones. Ten frames can either be used as manipulatives or they can simply be used as a visual representation. Which type you use can depend on the age of the student or your judgment of what’s needed.

Students can use these ten frames to add two 2-digit numbers. For example, when adding 36 + 18, a student would start with the following: To represent 36, there would be three filled ten frames and one ten frame with six dots. And to represent 18, there would be one filled ten frame and one ten frame with eight dots.

36 + 18

36

18

- 36
- 18
To add these two numbers, first the student would regroup the two ten frames with fewer than ten dots into one filled ten frame and one partially filled ten frame. Specifically, the student would regroup (or mentally move) two of the dots from the ten frame representing six ones and place them in the ten frame representing eight ones.

Now the student has one more group of ten than before, bringing the total to five tens. How many ones does he have left in the partially filled ten frame? Since he moved (regrouped) two of the six ones, he has four ones left. So the answer is five tens and four ones, or 54.
Once students have used ten frames to understand the regrouping concept, they can then carry that understanding into the symbolic representation shown by the written problem (Van de Walle & Lovin, 2005).

\[
\begin{array}{c}
36 \\
+ 18 \\
\hline
54
\end{array}
\]

In Accelerated Math for Intervention, you can use the C-R-A approach at learning stations or at individual conferences with students. We’ll see how a visual diagram can help a student solve an area word problem in the sample TOPS Report conference later in the chapter.

**When teaching word problems, focus on common underlying structures.** Word problems require students not just to perform operations with the numbers given but to use reasoning skills to determine what the problem is asking them to do. Therefore, the IES practice guide recommends that, when teaching students to solve word problems, teachers keep the focus on the underlying math structure and deep conceptual understanding (Gersten et al., 2009). Avoid teaching students shortcuts that may not always work, such as identifying key words in the problem that point to specific operations. This shortcut, which teaches students to associate key words (such as “more,” “altogether,” “gave away,” “left over,” “times,” and “among”) with mathematical operations, is not rooted in true understanding and can become a roadblock. Consider the following two problems:

“Jill gave away 6 cookies in the morning. She gave away 2 cookies in the afternoon. How many cookies did she give away that day?” (Kelly & Carnine, 1996, p. 5).

José took the 26 baseball cards he no longer wanted and gave them to Brian. Now José has 71 baseball cards left. How many baseball cards did José have to begin with?

Interpreting the key words “gave away” or “left” to indicate subtraction leads to an incorrect solution in both situations. The problem is that key words can be misleading when word problems contain indirect or inconsistent language. Because it focuses students’ attention on isolated bits of information and leads them to fail to consider the whole problem context, the key word strategy does not teach for understanding. Also, many problems don’t have key words (Van de Walle, 2004).

Instead, the best approaches for word problems are those that ask the students to represent their problem-solving and reasoning processes in a systematic way. This can be done through drawing diagrams and through conversations with the student about how he decided what to do. In addition, the IES practice guide includes
helpful guidelines for teaching students about the structure of various problem types, how to characterize problems based on structure, and how to determine appropriate solutions for each problem type (Gersten et al., 2009). Students learn to identify, for example, whether the problem is a change problem (in which a quantity is either increased or decreased) or a compare problem (in which two different types of items are compared). One explicit method for focusing on the underlying math structure of word problems is called schema-based instruction, or SBI (Jitendra, 2007). This systematic approach teaches students to use schematic diagrams to represent and organize the information. Representing the problem diagrammatically alleviates the burden of having to represent the problem mentally, thus reducing the cognitive load of the task. This approach has been shown to benefit elementary, middle and high school students, both those with and those without learning disabilities (Jitendra, 2007).

Teach multiple solution methods. Another sound approach to help your students develop deep procedural fluency involves the teaching of multiple strategies. The Center on Instruction recommends the use of multiple fact strategies, using the following example: If students are shown that \(5 \times 9\) has the same value as \(9 \times 5\), they can either treat the problem as five nines or as nine fives. They could also be shown that \(5 \times 9\) is equivalent to 10 fives minus one five (Jayanthi et al., 2008). Discussing multiple ways to arrive at the same answer can help deepen students’ understanding of the relationships among the operations and strengthen their number sense.

Teaching multiple solution methods works with word problems as well. You can model two different ways of solving a problem, or you can show one way to solve the problem and then ask students to think of another way. This helps ensure that you are teaching for understanding, flexibility, and critical judgment (when and how to use the procedures appropriately). Below is an example of three methods you can teach to solve proportion word problems (Jitendra, Woodward, & Star, 2011):

Problem: Carlos is on the school’s track team. He takes 54 minutes to run 6 miles. How long did it take him to run 2 miles?

Solution Strategy 1: Cross multiplication.
In this strategy, you’ll teach students to set up the two ratios/rates as follows:

\[
\frac{54 \text{ minutes}}{6 \text{ miles}} = \frac{x \text{ minutes}}{2 \text{ miles}}
\]

When cross multiplying to solve for \(x\), you get: \(2 \times 54 = 6 \times x\). So \(6x = 108\). To solve this equation for \(x\), you’ll divide both sides of the equation by 6. So \(108 \div 6 = 18\). The answer, 18, is the number of minutes it takes to run 2 miles.
This cross product algorithm method will always work for problems of this nature, but it does not tell you or your students much about the situation, i.e., it does not tell why it works. In contrast, the other two solution strategies are easy to reason in your head and tell you about the rate or ratio. Therefore, teaching the cross multiplication method in isolation is not likely to help the student understand the integer multiplicative relationships of ratios/rates and thereby reduce computational demands. The alternative strategies below are less complex computationally and more efficient than the cross multiplication for problems such as the above. Solution Strategy 2 might help with this conceptual understanding of proportions involving two equivalent ratios, i.e., 54 minutes to run 6 miles and \( x \) minutes to run 2 miles.

Solution Strategy 2: Equivalent fractions.
In this strategy, you’ll start by setting up the ratios/rates. Then remind the students that they are equivalent.

\[
\text{Equivalent Fractions:}
\]

\[
\frac{54 \text{ minutes}}{6 \text{ miles}} = \frac{x \text{ minutes}}{2 \text{ miles}}
\]

This means that the numerator and denominator of the first fraction are related to the numerator and denominator of the second fraction in the same way. Specifically, you can multiply (or divide) the numerator and denominator of the first fraction by the same number to get the numerator and denominator of the second fraction. Students can use this knowledge about equivalent fractions to come up with the solution a different way.

Teach the student to start with the given ratio and reason as follows: 6 divided by what number equals 2? Since the answer is 3, then you divide 54 by 3 to get \( x \). So \( x = 18 \). The answer, 18, is the number of minutes it takes to run 2 miles.
Solution Strategy 3: Unit rate strategy.
In this strategy, you’ll start by setting up the ratios/rates. Then you can teach students yet another strategy, called the unit rate strategy, to solve this problem.

Unit Rate Strategy:

\[ \frac{54 \text{ minutes}}{6 \text{ miles}} = \frac{x \text{ minutes}}{2 \text{ miles}} \]

In this method, you’ll use the known ratio/rate (54 minutes/6 miles) to figure out how many minutes 1 mile takes. For every 1 mile he runs, 9 minutes pass. So if he runs 2 miles, you know that 2 \times 9 minutes pass. In other words, you start with the given ratio and reason as follows: 6 times what number equals 54? Since the answer is 9, then you move to the second ratio and multiply 2 by 9. So \( x = 18 \). The answer, 18, is the number of minutes it takes to run 2 miles.

Students will see that they can arrive at the correct answer by using three different methods: the cross multiplication method, the equivalent fraction method, and the unit rate method. The cross multiplication method will always work, but it is best taught when paired with more meaningful strategies (such as equivalent fractions or unit rate) that help the students understand the concepts involved.

Having a number of strategies to fall back on can be of great benefit when solving problems. For example, to solve \( \frac{54 \text{ minutes}}{6 \text{ miles}} = \frac{x \text{ minutes}}{10 \text{ miles}} \), the equivalent fractions method isn’t easy to apply, but the unit rate strategy is. Of course, when deciding whether to teach multiple solution strategies, always use your judgment. If you feel that teaching multiple strategies right away might overwhelm a student, you may decide to start with one approach—perhaps you can tell which approach will make the most sense for the student at hand—and wait for opportunities to show the student other approaches at a later time.
Instructional Strategies in Action: A Sample TOPS Report Conference

All of the above instructional strategies—explicit and systematic instruction, student think-alouds, visual representations and manipulatives, focusing on common underlying structures in word problems, and multiple solution methods—can be used in Accelerated Math for Intervention. When deciding which strategies to use with a given student, you’ll take into account the type of problem the student is struggling with, the learning style and personality of the student, the level at which the student is working, your own experience, and a variety of other factors. Later in the chapter, we’ll discuss instructional adaptations for various learners, and we’ll introduce several tools included in the program to assist with your instruction. For now, we’ll take a closer look at the core instructional opportunity in Accelerated Math for Intervention: the one-on-one TOPS Report conference.

You’ll hold individual conferences with your students as they work in Accelerated Math. The conferences are frequent, short, and purposeful; they capitalize on the value of timely feedback and its link to student success. Three important pieces of information drive instruction during the conference: the assignment the student was working on, the student's work for each problem, and the TOPS Report. Using these pieces of information, you can target instruction to address the very problems with which the student needs help. You and the student look at the student’s work for error analysis, instruction, and readiness for further practice.

During the conference, it’s important to be systematic and to balance explicit instruction with opportunities for the student to verbalize his thinking. You can find out where the student’s understanding is breaking down. Is it procedural? Conceptual? Is it due to lack of automaticity with basic math facts? You can analyze the situation by asking questions and then provide instruction tailored to meet the student’s needs. What follows is a sample conference that helps illustrate this process.

Steven is a seventh-grade student in an Accelerated Math for Intervention class. He’s currently working in the fifth-grade library of objectives. When Steven’s teacher meets with him for a conference, she can see at a glance on his TOPS Report (see p. 101) the following information: the objectives included on the assignment, his overall score, and his incorrect responses. In this case, the objectives included on this assignment are Objective 125 (determine the perimeter of a polygon) and Objective 130 (word problems that involve determining the area of a square or rectangle). Steven’s overall score is 58 percent; he has answered five of the 12 questions incorrectly.
Steven’s TOPS Report shows that he understands how to calculate the perimeter of a polygon but he’s struggling with area word problems. By looking at his practice assignment and his work shown (see p. 102), Steven’s teacher sees that drawing a diagram helped him solve problem 26 correctly. However, when Steven reached problem 27, he didn’t draw a diagram and got it wrong. Instead of thinking about what the problem was truly asking, it seems that he just multiplied the two numbers that he saw in the problem.
Practice

L. Parker
Math 7B
East Middle School
Form Number 3280

Objective: (2 of 2 listed)
125. Determine the perimeter of a polygon
150. Find the area of a square or rectangle

25. What is the perimeter of the figure?

[A] 54 cm  [B] 58 cm  [C] 50 cm  [D] 144 cm

26. Mrs. Taylor is waterproofing the top of a rectangular wood deck. The width of the deck is 2 m less than the length. The length is 8 m. What is the area to be waterproofed?

[A] 16 m²  [B] 28 m²  [C] 48 m²  [D] 46 m²

27. Mr. Ramirez is a wheat farmer. He has a rectangular field that has a width of 3 miles and a perimeter of 14 miles. What is the area of the field?

[A] 12 mi²  [B] 24 mi²  [C] 42 mi²  [D] 22 mi²

Steven Thompson
3280

25. Perimeter
18 + 8 + 4 + 3 + 10 + 3 + 4 + 8 = 58 cm

26. Area
8 m x 6 m = 48 m²

27. Area
3 mi x 14 mi = 42 mi²
In the conference, Steven’s teacher starts by acknowledging that he is using the correct operation, multiplication, to find the area. She then helps him understand why he must be sure to choose the correct numbers to multiply. She also tells Steven to draw diagrams to help him slow down and read through the word problems, as he did with problem 26.

Here’s a script of the conference:

Teacher: Hi Steven. I see you struggled a bit with this practice.
Steven: Yeah, I didn’t like the word problems.
Teacher: Why not?
Steven: I couldn’t figure out what to do.
Teacher: Okay, let’s see what happened. Hmmm... It looks like you got problem 26 right. Can you tell me how you did that?
Steven: I drew a picture. I wrote down the width and then figured out the length and then multiplied them together.
Teacher: Great! What did you do for problem 27?
Steven: I multiplied the two numbers since it said to find the area.
Teacher: You’re on the right track—you do multiply to find area. But you need to make sure that you’re multiplying the right numbers. What might help you do that?
Steven: Draw a picture?
Teacher: Yes. I like to call it a diagram. Drawing a diagram can help you understand the problem. Also make sure you read it a couple of times to think about what it’s asking. Let’s do 27 together, and then you can rework the rest on your own.
Steven: Okay.
Teacher: So, to find the area of a rectangle, you need to multiply the length times the width. This problem is asking for the area of Mr. Ramirez’s field. I know the field is a rectangle, so I’ll start by drawing a rectangle. What else do I know? I know the width, so I’ll write that on my diagram. I also know that the widths are the same on both sides of a rectangle, so I’ll write “3 miles” on each side.

```
3 miles

3 miles
```

Now, do I know the length? No. What do I know?
Steven: The perimeter.
Teacher: Right. I know the perimeter. What does perimeter mean?
Steven: It’s the total of all the sides added together.
Teacher: Right! Since I know the width but not the length, I can’t calculate the area yet. First I’ll need to figure out the length. So how do I find the length of the rectangle? Well, I know that the width of one side is 3 miles and that the width of the other side is also 3 miles. If I add those together, that makes 6 miles. Then I can take the perimeter, which is 14 miles, and subtract 6. I get 8 miles. I know that the two lengths add up to 8 miles, and I know they are the same size because it’s a rectangle. So what do I do now to find the length of one side?

Steven: Divide 8 by 2?
Teacher: Correct! What’s 8 divided by 2?
Steven: 4
Teacher: Right. So let’s label our diagram.

Steven: Length times width equals area.
Teacher: That’s right. So 4 times 3 is 12. Our answer is A, or 12 square miles. Do you understand how we got the answer?
In this example, the teacher used several instructional strategies: First, she asked Steven to verbalize his thinking to aid in her error diagnosis. She was able to confirm her suspicion that for problem 27, he had just multiplied the two numbers and had not thought through what the numbers were really representing. It's not a math-fact error that led Steven astray—he seems to know his multiplication facts. Instead, it's a procedural error.

So the teacher showed Steven how to draw a visual representation of the word problem to help him understand what the problem was asking and to help him organize the information given. (Note that the visual representation is a diagram, not a pictorial representation; it looks like a rectangle, not like a field of wheat. Irrelevant pictorial details don't help with the student's understanding of the math involved (Hegarty & Kozhevnikov, 1999).) The teacher also provided explicit instruction about how to do the problem correctly. She did this by thinking aloud as well as providing opportunities for Steven to participate in the solving of the problem.

Notice how helpful it was for Steven's teacher to have everything in front of her—the assignment, work, and TOPS Report. Because she had taught her students the routine of stapling these papers together right when the TOPS Report prints, she knew that Steven would bring everything he needed to the conference.

Steven's teacher will now be able to evaluate the effectiveness of her instruction and see whether Steven really understands the procedure for working this type of problem correctly from now on. She'll ask him to correct his work on the other problems and see how he does.
More Instructional Tools

Steven’s teacher taught him a strategy for solving area word problems. But what if a student continues to struggle with a certain objective? What if there are gaps in his knowledge from prior levels that are impeding his success at the current level? Perhaps he needs to review some terms and concepts and see worked examples of prior objectives. Maybe he even needs a bit of additional instruction and practice with these prior objectives. When you suspect this to be the case, you may wish to utilize additional instructional tools within the Accelerated Math software such as Learning Progressions for Instructional Planning, worked examples, or the math glossary. In addition, the 2Know! Toolbar is useful when facilitating whole-group or small-group fact fluency practice or teaching students how to approach problems in a whole-class or small-group setting. Finally, the *Numeracy Development and Intervention Guide* is a useful resource for helping students with number sense development.

**Accelerated Math Learning Progressions for Instructional Planning**

The Accelerated Math Second-Edition Libraries were built with the input of math curriculum experts, assessment experts, and active classroom teachers. A set of core objectives were identified, which were aligned with the NCTM Curriculum Focal Points, National Math Panel recommendations, and state and international standards. These core objectives are the most critical mathematics objectives for a student to learn at a grade level. They are key building blocks in a student’s mathematics education. Each core objective fits into a progression of math skills.

Accelerated Math includes a link to Learning Progressions for Instructional Planning, which allows you, among other things, to search for prerequisite objectives for many core objectives. If you are working with a student on a particular problem, these prerequisite objectives can help you identify the math skills you may need to review or teach in order for the student to have success going forward.

In short, Learning Progressions can help with further diagnosis and remediation for struggling students. It does this by helping you more easily pinpoint gaps in a student’s knowledge and provide extra practice and instruction on those prerequisites that may be holding the student back. Let’s turn to an example to see how it works.

Say you are working with a student who is having trouble with word problems involving ratios in the sixth-grade library of objectives. Within your Accelerated Math Assignment Book, click Learning Progressions under Objectives on the left side of the screen. Within the Libraries & Learning Progressions tab, you can perform a search for core objectives of this type by checking the boxes next to 2E Grade 6 and Percents, Ratios, and Proportions and then clicking Search (see p. 107, above). The search will return the six core objectives shown (see p. 107, below).
Perhaps you know that the student is struggling with a grade 6 objective on ratios, a word problem objective that asks her to determine the whole given a ratio and part. You can use the Learning Progressions to find the objective and see it in relationship to other objectives related to ratios (shown here) or you can search to see it in relationship to all of the other objectives in the grade 6 library. If you click the plus sign next to the objective called “WP: Determine the whole given a ratio and a part where the whole is less than 50” (WP stands for “word problems”), it expands so you can review the terminology, concepts, and skills associated with this objective as well as the prerequisite terminology, concepts, and skills. Learning Progressions also lists objectives that encompass the skills that are prerequisite, which are in this case from the fourth- and fifth-grade libraries.

At this point, you may choose to spend some time with the student reviewing how to determine equivalent fractions not in simplest form. Or you might review what an equivalent ratio is. All of the information you need—the prerequisite objectives and the prerequisite terminology, concepts and skills—is right at your fingertips.

Within Learning Progressions, you can also pull up worked examples and sample problems for many core objectives or their prerequisites to use as teaching tools. These tools, combined with information listed above, inform how you’ll review the
student's work to diagnose errors and how you might refresh skills and reteach. Let's see how this works by looking at the worked example and sample problems for the original core objective for which we searched.

To access the worked example, simply click the View Worked Example icon to the right of the objective. The worked example gives a step-by-step framework for how to solve a sample problem from that objective. While using the worked examples as teaching tools, you will likely need to elaborate on the approach, the steps, and why they work. In addition, worked examples usually display a single method for solving the problem presented, although multiple methods may be possible. This opens the door for you to deepen student understanding by discussing alternate methods or even asking the student if another way occurs to her. You can see a worked example below.

**WP: DETERMINE THE WHOLE GIVEN A RATIO AND A PART WHERE THE WHOLE IS LESS THAN 50**

**Problem:**
Sam plays on his school's basketball team. During the last game, the ratio of baskets he made to the total number of baskets he attempted was 5:8. If Sam missed 15 baskets, how many baskets did he attempt last game?

**Step 1:**
Determine the number of baskets Sam missed out of every 8 attempts.

\[
\text{baskets attempted} - \text{baskets made} = \text{baskets missed}
\]

\[
8 - 5 = 3
\]

**Step 2:**
Write a ratio for the number of baskets missed out of every 8 attempts.

\[
3:8
\]

**Step 3:**
Write a ratio equivalent to 3:8 that uses the actual number of baskets Sam missed as the first term and uses the number of baskets attempted, 8, as the second term.

\[
3:8 = 15:n
\]

**Step 4:**
Write the equivalent ratios in fraction form.

\[
\frac{3}{8} = \frac{15}{n}
\]

**Step 5:**
Determine the value of \( n \).

\[
\frac{3 \times 5}{8} = \frac{15}{n}
\]

\[
n = 40
\]

**Answer:**
40

Worked examples show how to solve a problem step by step.
Once you have reviewed the procedural steps shown in a worked example, you may wish to look at some unsolved problems with the student. To pull up a few sample problems from the objective, simply click the View Example icon to the right of the objective. Unlike the worked examples, these sample problems do not include solutions or steps. Instead, they can be used one-on-one as you “think aloud” to model how to solve the problem and to involve the student in the problem-solving process. You can then ask the student to solve one of the sample problems while thinking aloud in order to check for comprehension. These sample problems can also be used in small-group or whole-group discussions if students are working on the same, or similar, objectives. You can see the sample problems for objective 85 below.

**WP: Determine the whole given a ratio and a part where the whole is less than 50**

1. Mrs. Abbott’s art class includes both sixth graders and seventh graders. The ratio of sixth graders to the total number of students in the class is 3:8. There are 20 seventh graders in the art class. How many students are in the art class?
   - [A] 32
   - [B] 23
   - [C] 60
   - [D] 100

2. Amber plays on her school’s basketball team. During the last game, the ratio of baskets she made to the total number of baskets she attempted was 4:7. If Amber missed 6 baskets, how many baskets did she attempt in the last game?
   - [A] 18
   - [B] 10
   - [C] 14
   - [D] 24

3. A local baseball tournament includes in-state and out-of-state baseball teams. The ratio of in-state teams to the total number of teams in the tournament is 3:7. There are 20 out-of-state teams in the tournament. How many teams are in the tournament altogether?

Sample problems do not include solutions or steps.

These tools—the list of terms, concepts, and skills; the prerequisite objectives; the worked examples; and the sample problems—can help you identify precisely where the learning breaks down for the student, and can help you craft an instructional response. If you see that a student is struggling with a particular objective, you can find the prerequisite objectives to review and reteach those skills. This does not
mean that you necessarily need to move the student to a lower library from that point on. Instead, it may be appropriate to isolate the skills remediation to the content strand in question and then allow the student to resume work at the original level. If the gaps in a student’s knowledge are more serious, however, more extensive intervention and reteaching may be required. As always, use your judgment about how to proceed.

Math Glossary
The math glossary is another helpful tool within the Accelerated Math software. It provides definitions and, in most cases, visual representations of various math terms and concepts. The terms included are those considered to be the most important terms that students should know in order to be successful with the second edition libraries of objectives. To access the math glossary within the Accelerated Math Assignment Book, click Math Glossary under Other on the left. You can use the math glossary as a quick reference when explaining concepts to students, by searching or browsing for terms. For instance, the screen shot below shows terms beginning with the letter A.
If you click the term “acute angle,” you’ll get a written definition and a visual representation (see below). Next to the term is a small speaker icon. If you click that icon, you’ll hear an audio pronunciation of the term and its definition.

Additionally, some terms have animation. For instance, on p. 113 is a screen shot of the term “equivalent fractions.” To the left of the images, there is an icon labeled Play. If you click that icon, the animation starts by showing the visual representation of 1/3. Then the fraction bar representing 1/3 becomes 2/6 to show they are equivalent. Finally, the 2/6 fraction bar slides over so you can see the two fractions side by side. The animation feature can be found on a number of the more complicated terms in the math glossary that may need more conceptual or procedural explanation.
Renaissance Responders and the 2Know! Toolbar

It's widely accepted that math fact fluency and strong number sense are essential for student success with higher-order problems. The IES practice guide notes that “interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts” (Gersten et al., 2009, p. 37). Within Accelerated Math for Intervention, MathFacts in a Flash is the key tool to promote and monitor automaticity of basic math facts. We discussed in prior chapters how you can use MathFacts in a Flash on classroom computers for practice and to assess for automaticity, and how you can use Renaissance Responders to extend valuable math facts practice, under similar conditions, offline.

The 2Know! Toolbar is another valuable tool you may wish to use during the beginning and ending of class to provide additional whole-class practice. This simple program lets you get real-time responses from your students via Renaissance Responders. You can ask multiple-choice, true/false, numeric-response, pulse, or short-answer questions. You can project the toolbar for all students to see; answers will be displayed anonymously, allowing students to stay engaged in a low-risk setting. After all participants have responded, you can display a graph which indicates the correct response as well as the number of students who chose each response. This provides immediate feedback for the students and
allows you to immediately assess whether your students understand the concepts you’ve been discussing. (For more information about setting up and using the 2Know! Toolbar, see the 2Know! Classroom Response System Setup and Resource Guide. To access this guide, log into Renaissance Place, click Manuals in the upper right corner of any page, and you’ll find it located under Accelerated Math.)

**2Know! Toolbar**

![2Know! Toolbar Graph](image)

**2Know! Toolbar Graph**

To use the 2Know! Toolbar for fact fluency practice, simply ask your class for facts and have them answer with the Renaissance Responders as quickly as possible.
You and they will be able to see instantly how fast the responses come in and what percentage of the class is answering correctly. This is just one way to start or end class, devoting a few minutes to whole-group practice focused on basic facts everyone in the class should know. Some teachers do skip counting forward and backward vocally, for example. These activities create competition and a group goal at the same time, and are effective ways of fitting in math fact practice. Renaissance Responders are merely another way to do this type of group practice.

Whether you choose to use the 2Know! Toolbar for fact fluency practice or not, students benefit from multiple methods of practicing math facts. Flash cards and worksheets printed from the MathFacts in a Flash software can also be used during whole-class or small-group work, and you may decide to use paper-and-pencil tests or other group activities. These are all important supplements to individualized practice.

Another way you might use the toolbar is to solve a word problem with the whole class or a small group. It’s an efficient and engaging way to model the process of how to approach a word problem while simultaneously checking students’ comprehension. Students benefit by being able to participate without the risk of choosing the wrong answer in front of other students, since all responses are anonymous.

For instance, consider the following problem:

Sara saved $12.85 from her allowance. At the beach, she spent $1.75 for an ice cream cone and $4.50 in the video arcade. She wants to buy a necklace that costs $5.00. Does she have enough money left to buy the necklace?

The 2Know! Toolbar can help you model how to approach and solve the problem with the whole class following along. In this type of lesson, you stand at the front of the classroom and walk through a series of steps with your students. This is something you might do—even if your students are at different levels—to reinforce basic approaches to solving word problems for all of your students. The problem-solving steps might take the following form: 1) say back for yourself what the problem is asking, 2) think about what information is provided, 3) make a plan or move forward from what you know. Or, using a different approach: 1) work backward from what the problem is asking, 2) make a plan, 3) at some point stand back and “ballpark” the answer, 4) solve and compare your final answer with the ballpark estimation. Here’s how the lesson might unfold:

Teacher: I always start by making sure I can say back what the problem is asking. Does Sara have enough money to buy the necklace? That’s what we need to figure out. So first, let’s ask ourselves: How much does the necklace cost?

[Direct students to enter their numeric answers on Renaissance Responders. (The five most common answers and how many]
students entered these answers will be displayed on the graph."
Then tell the class what the correct response is and why.

Teacher:  *Let’s see what else the problem tells us. How much did Sara start out with?*

[Again, direct students to enter numeric answers on Renaissance Responders. Then go over the answer.]

Teacher:  *But Sara spent some of her money. How much did she spend?*

[Direct students to calculate and enter their answers. Then go over the answer and the process of getting that answer, if necessary.]

Teacher:  *Now, what operation should we use to find out how much money Sara has left?*

[Ask students to enter via multiple choice on Renaissance Responders: A for addition, B for subtraction, C for multiplication, or D for division. After all students have answered, reveal the correct answer and then ask for a student volunteer to explain how she knew which operation to use.]

Teacher:  *Great. Now we have a plan that’s taking us closer to the answer. But before we calculate the answer, let’s try to estimate how much money Sara has left. [Or: Before we calculate the answer, let’s make an educated guess: Do you think she’ll have enough money to buy the necklace?]*

[Direct students to enter answers on Renaissance Responders, using numeric answers or yes/no. Again, lead a short discussion before moving on to calculate the final answer.]

The above scenario is not a verbatim script, but it gives an idea of how you might model step-by-step problem solving with the whole class. Notice how the Renaissance Responders and the toolbar allow you to involve students at several points to be sure they are following along with your logic.

The 2Know! Toolbar, then, can be used during any kind of whole-group or small-group instruction. It’s a useful instructional tool that provides your students with variety, gets them engaged in a non-threatening way, and gives you an at-a-glance snapshot of how well they understand the material.

**Numeracy Development and Intervention Guide**
Regular fact fluency work is essential to success in math. Yet rote memorization by itself is not helpful; the rule of always teaching for understanding applies here as well. When students are learning math facts, it’s a good idea to give them time
to become efficient with meaningful recall strategies before drilling for fluency. An example of such a strategy is deriving unknown facts from known facts. For instance, when asked to calculate 5 + 4, students might tend to just count on their fingers. When asked to respond faster, they may just learn to count more quickly. Instead, it’s more helpful for them to learn a strategy that they can then apply in other instances. For instance, you could teach them that 5 + 4 is one less than 5 + 5 (just as 6 + 5 is one less than 6 + 6, and so on). Similar strategies can work for the other operations. If a student knows that 5 x 4 is 20 but is struggling with 6 x 4, you can remind her that 6 x 4 is one group of four more than 5 x 4, or 24. These approaches are based on understanding, and can be useful when calculating other unknown facts.

On the other hand, if strategies plus additional practice don’t help, check the student’s core understanding of the operation in question. In order for some students to achieve true automaticity, they may need more number sense development to understand the concepts and relationships between the facts they know. To do this, they need to be exposed to many ways to work with numbers. For instance, before becoming fluent in division math facts, they need to understand the concept of division. They also need to understand how the four arithmetic operations—addition, subtraction, multiplication, and division—are interrelated.

The Numeracy Development and Intervention Guide, written by mathematics education expert Dr. Kenneth E. Vos and included in the Accelerated Math for Intervention materials, is designed to support this important number sense work. It provides guidance to teachers on how to build math fact fluency and develop number sense by using various protocols to diagnose errors, address them, and evaluate results. It follows the concrete-representational-abstract approach described earlier and it includes many examples of how to use manipulatives and other visual representations as building blocks toward understanding abstract concepts. Teachers and aides can use this resource for working with small groups or one-on-one with students to provide enough support so students are ready to move toward automaticity.

**Adaptations for Various Learners**

You may teach specific populations of students, including English language learners, students with learning disabilities, or students with behavior disorders. The Numeracy Development and Intervention Guide includes adaptations for using the activities and protocols with various learners. Below are some additional guidelines for working with these learners.

**English Language Learners (ELLs)**

Like native English speakers, English language learners benefit from personalized math practice. However, when personalizing for ELLs, consider not only background knowledge and math readiness but English proficiency level as well. Keep in mind the needs of your ELLs whenever language is used to explain or deliver content, whether in word problems or in verbal instruction as you work with students. Also keep these needs in mind when using the software components of Accelerated
Math for Intervention—STAR Math, Accelerated Math, and MathFacts in a Flash. To be successful in math, English language learners need instruction in both math-specific vocabulary as well as non-math-specific vocabulary. Non-math-specific vocabulary includes both high-frequency words and low-frequency words. All of these types of vocabulary might show up within word problems. Here are some examples.

- Math-specific vocabulary: subtraction, trapezoid, proportion, fraction
- Non-math-specific vocabulary:
  - High-frequency words: before, after
  - Low-frequency words: snail, beluga

While STAR Math assessments may contain some word problems, the program isn’t as language-dependent as Accelerated Math. Therefore, when using STAR Math scores to help determine placement levels for ELLs in Accelerated Math, be sure to consider whether the student needs some language support or more English language instruction before using Accelerated Math.

If you identify ELLs with very little English proficiency, MathFacts in a Flash may be the best place to start (rather than Accelerated Math), since reading isn’t required during use and very little English is needed to log into the program.

Once ELLs have developed an intermediate knowledge of English, they will have more success using Accelerated Math, yet they may still need additional help with the vocabulary mentioned above. The math glossary in Accelerated Math may be a useful tool for teaching and reinforcing specialized math terms and concepts through the use of spoken audio and animations. Another strategy that is sometimes used is teaching cognates, which are words that are very similar in both languages, such as “perimeter” in English and “perímetro” in Spanish. However, when teaching math-specific vocabulary, keep in mind...
mind that relying on cognates is not always an effective strategy, because students might not have been exposed to these vocabulary words in their native language.

In addition, if your school or district uses English in a Flash (a Renaissance Learning software program for ELLs, sold separately from Accelerated Math for Intervention), you may find the vocabulary lists within the Accelerated Math software helpful. These vocabulary lists are simple descriptions of non-math vocabulary used in the Accelerated Math Second-Edition Libraries for early numeracy and grades 1 through 7. These lists were built to be compatible with English in a Flash. Specifically, the lists provide explanations for words that are *not* taught in English in a Flash and that therefore might present comprehension problems for ELLs using English in a Flash. For instance, the list includes the following words: *blanks*, *dominoes*, *glitter*. To help ELLs using English in a Flash understand these words, the explanations given in the vocabulary lists are written using words that *are* taught in English in a Flash. Below are some examples:

- *blanks*...... the lines where you write the answer
- *dominoes*...... a game
- *glitter*...... tiny, shiny decorations

These lists are not meant to give comprehensive definitions of the words but rather are meant to fill in any vocabulary gaps that may impede an English in a Flash user's understanding of a math problem. (To find the vocabulary lists, click Resources on the Home page in the Accelerated Math task list.)

**Students with Learning Disabilities**

Many of the research-supported recommendations included elsewhere in this chapter are effective for students with learning disabilities. For instance, Swanson (1999) identifies the following instructional components that work well with students with learning disabilities: sequencing instruction (using step-by-step prompts), drill-repetition and practice-review cycles, breaking the task into smaller units, question and response dialogue between teacher and student, sequencing tasks from easy to difficult, using technology to facilitate presentation and feedback, small-group instruction, supplements to instruction (aides, parent involvement, homework), and strategy cues such as the use of mnemonics and think-alouds. In addition, the National Center on Instruction identified seven effective instructional practices for teaching math to K-12 students with learning disabilities, based on a meta-analysis report and on the recommendations from the National Mathematics Advisory Panel's 2008 final report. These recommendations include using explicit instruction on a regular basis; using multiple instructional examples; having students verbalize decisions and solutions to math problems; teaching students to visually represent the information in math problems; teaching students to use multiple/heuristic strategies, i.e., a method that exemplifies a step-by-step, generic problem-solving approach that is not problem-specific; and teachers using ongoing formative assessment data and feedback (Jayanthi et al., 2008).
Students with Behavior Disorders
Students with behavior disorders work best when they are engaged, and they generally respond positively to graphic organizers. Above all, these students typically function best in highly structured classrooms, so make sure your class routines and rules are clear and consistent. One of the most common childhood behavior disorders is Attention Deficit/Hyperactivity Disorder (ADHD). The National Association of School Psychologists issued recommendations for teaching students with ADHD (Brock, 2002). These include: keeping assignments short or breaking longer projects into manageable parts; using direct instruction; presenting novel, interesting, highly motivating material; providing carefully structured lessons and material; having well-defined rules with clear consequences that are reinforced through visible reminders; allowing students to set their own pace of work; allowing opportunities for physical movement; assigning tasks that require active (as opposed to passive) responses; and keeping distractions to a minimum.

Summary

- Accelerated Math for Intervention acts like a global positioning system (GPS), helping you to gauge the need for instruction and keep students on course.
- Always teach for understanding. For instance, use explicit and systematic instruction, encourage students to think aloud, and use visual representations and manipulatives. When teaching word problems, focus on common underlying structures. When appropriate, teach multiple solution methods.
- The TOPS Report conference is a core instructional routine of Accelerated Math for Intervention. Frequent, short, and purposeful, the conference capitalizes on the value of timely feedback. It’s also a great opportunity to use the effective instructional strategies listed above.
- Accelerated Math’s Learning Progressions for Instructional Planning allows you to search for prerequisite objectives for many core objectives. This can help with further diagnosis and remediation for struggling students. Worked examples and sample problems can also assist with your teaching.
- The math glossary within Accelerated Math provides definitions and visual representations of various math terms and concepts.
- You can use Renaissance Responders and the 2Know!Toolbar to provide additional whole-class practice on math facts and instruction on problem-solving approaches.
- The Numeracy Development and Intervention Guide includes helpful activities for students who need further number sense work.
- You may need to adapt your teaching for various learners, including English language learners, students with learning disabilities, and students with behavior disorders.
Online Resources

The following is a list of online resources that provide instructional information for math teachers.

Center on Instruction
http://www.centeroninstruction.org/
The Center on Instruction is a national comprehensive center funded by the U.S. Department of Education that provides resources and expertise about instruction in reading, mathematics, science, special education, Response to Intervention (RTI), and English language learning. Resources found on this Web site include research syntheses, practice guides, professional-development modules, and classroom observation tools. The math strand includes materials and resources to build educators’ knowledge of instruction for students with low achievement in mathematics, improve professional development models for math teachers, and build teachers’ skills in monitoring student growth toward important math outcomes.

NCTM Illuminations
http://illuminations.nctm.org/
This site, hosted by the National Council of Teachers of Mathematics (the membership organization for math educators throughout the U.S. and Canada), provides online activities, lesson plans, standards (including video clips of real classrooms, showing students and teachers working on a variety of math concepts and grade levels), and links to other online math resources.

National Math Advisory Panel
http://www2.ed.gov/about/bdscomm/list/mathpanel/index.html
Created by the U.S. Department of Education, the National Math Advisory Panel conducted a systematic and rigorous review of scientific evidence for the teaching and learning of mathematics. Several task groups and subcommittees focused on specific areas of math teaching and learning. The research findings as well as concrete steps to improve math education can be found in reports available at this Web site.

Doing What Works
This site is an online library of resources sponsored by the U.S. Department of Education to help teachers and schools implement research-based instructional practices. Much of the content is based on information from the Institute of Education Sciences’ What Works Clearinghouse. The research findings cited in the National Mathematics Advisory Panel reports underpin the mathematics practices and content included on the Doing What Works Web site. Each practice includes an overview, the research base behind it, examples of schools engaged in the practice, and examples of tools to improve your own practice.
References


Chapter 6
Measuring the Success of Your Implementation

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Measuring the Success of Your Implementation

As the school year draws to a close, you’ll want to take some time to evaluate the success of your implementation and to begin to make data-based plans for the next school year. One tool to assist with this evaluation is the STAR Math Growth Report, which helps you compare student data between any two assessment dates. In addition, you may wish to reflect on some key questions provided in this chapter to help you assess the success of each component of your implementation. Finally, this is also a good time to evaluate the elements of your classroom management system, including the different activities and routines you have in place. Since there are a number of different ways you can choose to run your class, fine-tuning your implementation each year can help you find what works best for you and your students.

Using the STAR Math Growth Report

Begin your end-of-year evaluation by looking at the STAR Math Growth Report (see the example on p. 126) for indications your math intervention program is working long-term. The Growth Report allows you to measure student progress between two testing sessions. In the report options, choose a pretest date range close to the beginning of the school year, and use the last time you gave the STAR Math assessment for the posttest date range. The report will list each student’s latest test score from these two date ranges, one above the other.

Gauge growth from one testing period to the next by looking at scores such as percentile rank and scaled score. Indicators of healthy intervention programs include:

- Nearly all students are making gains in their percentile ranks.
- Nearly all students have increased their scaled scores.
- Achievement is equitable. Students in all demographic groups—gender, ethnicity, language, socioeconomic status—are achieving.

If most or all of your students are making progress, take some time to reflect upon the instructional strategies and classroom practices that have worked well. Plan to continue and build upon these elements next year. If some, but not all, of your students are making progress, identify which practices are working well and try to identify why these practices are contributing to success for those students.

Look at the report for indicators of issues as well. Are some students barely maintaining their percentile ranks? If it’s just a few students, look at any specific
### Growth Report

**School:** Metem Elementary School  
**Report Date:** 09/12/2010 - 09/17/2010

#### Class: Mrs. Hudson's Math

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<th>Student</th>
<th>Class</th>
<th>Teacher</th>
<th>Test Date</th>
<th>GP</th>
<th>SS</th>
<th>GE</th>
<th>PR</th>
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<td>Hudson, Julia</td>
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<td>18-29</td>
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<td>Hudson, Julia</td>
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<td>4.2</td>
<td>27</td>
<td>20-41</td>
<td>43.0</td>
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#### Summary

- **Pretest Mean:** GP: 4.04  
  SS: 532  
  GE: 2.8  
  PR: 19  
  NCE: 31.6
- **Posttest Mean:** GP: 4.88  
  SS: 615  
  GE: 4.8  
  PR: 48.1  
  NCE: 48.1

#### Class: Math 4A

**Growth Summary**

- **GP:** Increase  
- **SS:** Increase  
- **GE:** Increase  
- **PR:** Increase  
- **NCE:** Increase
Measuring the Success of Your Implementation

factors that might be impeding their achievement. Perhaps you need to adjust your instructional strategies so that they better address individual needs. Or if the students in question are English language learners, perhaps they need more language support.

In addition, look at the Summary section of the report, which lists the pretest and posttest mean scores across five metrics. The next page of the report is a visual representation of that data. Does the comparison of the mean scores for each category look flat, indicating modest growth? If so, begin thinking about how to improve your implementation next year. Perhaps you can find ways to enhance your use of instructional strategies or modify your classroom model to maximize academic engaged time for all students. If, on the other hand, the bars representing the mean scores have grown substantially across each category, this is a sign that your implementation is working well. Keep track of how you set up your classroom model and which strategies and practices you used so you can draw upon these experiences next year.

Questions to Consider

As you begin making concrete plans for the next year, it may help to revisit the three elements struggling math students need most that we identified in Chapter 1, and to look at whether your class routines help support your implementation. Below are some questions to help evaluate how things are going in these areas.

Automaticity with basic math facts
- Have you built in at least 10 minutes of daily math fact fluency practice (or the equivalent)?
- Are you facilitating important number sense development for students who need it?
- Have you built in a variety of ways for students to develop math fact automaticity, including MathFacts in a Flash on classroom computers, math fact practice on Renaissance Responders, Renaissance Home Connect, flash cards, and small-group or whole-group activities?
- Are the effort-based goals you set for students helping them master the appropriate number of levels to achieve growth?

Mastery of critical skills
- Are you using Accelerated Math software to help pinpoint gaps in your students’ knowledge?
- Are you providing targeted instruction in one-on-one conferences?
- Do you use research-based effective strategies that take into account each student’s instructional needs? Note which strategies have proven especially effective so that you can continue and expand upon them.
- Are the effort-based goals you set for students helping them master the appropriate number of objectives to achieve growth?
Student motivation and self-efficacy

- Have you ensured that all students in your class have the chance to experience success in math?
- Do you give positive reinforcement in your one-on-one conferences?
- Have you built in ways for students to work independently and ask for help when they need it, so that they take control of their own learning? If not, think about adding protocols for reworking missed items, or adding resources and teaching students how to use them.
- Do you encourage students to track their own progress and keep them informed about the progress they are making toward their goals?

Classroom management

- Do your classroom routines help maximize academic engaged time, or is any time wasted in transitions from one activity to the next?
- Are there any worrisome trends you have identified, such as behavior problems or students not knowing exactly what they are supposed to be doing at all times? If so, think about creating new rules or routines for next year that will solve the problem.
- Also examine the routines you have put into place for yourself. Do you find that you are using class time to figure out what individual students should be doing? If so, think about record-keeping routines you can do before or after each class to help things run more smoothly.
- During class, do you find it unduly difficult to monitor all students and hold one-on-one conferences at the same time? If so, try to identify routines and resources that would help facilitate students working independently. You will still need to do some light monitoring while holding conferences, but these routines can help keep students productive while allowing you to focus on providing quality instruction.
- Finally, which routines have been most successful for you and your students? Make a note of these routines and plan to use them again next year. You’ll start the year off confident in these proven classroom practices.

Making Plans for the Next School Year

As you reflect on the answers to the above questions, the most important thing to do is to identify which classroom practices have worked in your intervention program and which ones were not effective. Figure out how you can continue the successful practices and build upon them. As for the ineffective practices, identify whether the problem was with the practices themselves or with the way they were carried out. Decide whether you need to improve a practice or abandon it for another.

The experience you gain with each year of implementation is invaluable. In order to best serve all students, consider starting a mentoring program among your school’s math intervention teachers. That way, teachers new to Accelerated Math for
Intervention can be paired with the school’s most skilled users of the program. The experienced teachers can share best practices and help get the newer teachers up to speed more quickly. After all, once the program is in place, it has limitless potential to help you accelerate learning for all students who struggle with math.

**Summary**

- Use the STAR Math Growth Report to help evaluate your intervention program.
- Evaluate how well you are meeting your students’ needs for automaticity with basic math facts, mastery of critical skills, and motivation and self-efficacy.
- Consider whether your classroom routines can be improved in order to help your class run more smoothly, keep students productive, and allow you to focus on providing quality instruction.
- Next year, focus on continuing the practices that were most successful and improving upon those that were least effective.
- Consider starting a mentoring program for Accelerated Math for Intervention teachers in your school.
Chapter 7
Common Questions

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Questions will likely arise as you are implementing all of the elements of Accelerated Math for Intervention. Here are answers to a few common questions, some about the program as a whole and others specific to the individual software and hardware components.

**General Questions**

**Does Accelerated Math for Intervention require an additional class?**

We do recommend a separate session or class for students in intervention in addition to core math instruction, although Accelerated Math for Intervention can be used in other settings as well. Ideally, a full class period will be made available for math intervention each day. This model will provide the most academic learning time, allow for more personalized instruction, and get the best results.

**If I have the assistance of one or more instructional aides, what are the best ways to run my class?**

Instructional aides can be a great resource. They can help free you up to work with students individually by monitoring or running the other learning stations in your classroom. You may also be able to utilize community volunteers or student aides for this purpose.

**What if I don’t have any aides available to me?**

If you don’t have assistance from aides, you may want to scale back the number of learning stations in your class and invest more time in creating routines and resources that will allow students to work independently.

**What’s the best way for me to run my class if I’m working with a co-teacher?**

The two of you can share the task of conducting one-on-one conferences with students who are working on critical skills development. On another note, be sure that you are both on the same page when it comes to classroom management. Students are unlikely to follow routines that are inconsistently enforced, so it’s important to present a united front on how the class will be run.

**I am having problems with students misbehaving and not coming to class. What can I do?**

Make sure that you are communicating frequently with your students’ parents or guardians, keeping them in the loop about how important your math intervention class is to their child’s academic achievement. You may wish to share their child’s STAR Math Progress Monitoring Report with them or use another type of chart that helps show their child’s progress. Let them know about Renaissance
Home Connect. Share your concerns about absenteeism with other teachers and administrators in your school so that you can brainstorm solutions together about how best to support the families involved. If behavior is a problem and you are not already doing so, you may wish to use a behavior modification system. Some useful guidelines for setting up and refining systems can be found in “From Ringmaster to Conductor,” by Matthew A. Kraft, *Kappan*, April 2010, pp. 44-47.

**How do I find students’ user names and passwords for Renaissance Place?**

You can find this information by viewing or printing the Student Information Report for MathFacts in a Flash or STAR Math. (Instructions for printing reports are on p. 143 and p. 146 in the appendix.)

**STAR Math Questions**

**How often should I administer STAR Math?**

We recommend administering the STAR Math assessment at least once a month. This recommendation aligns with the guidance provided in the Institute of Education Sciences (IES) practice guide, *Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools*, and allows for a balance of capturing growth as it occurs while avoiding testing burnout. Use your judgment when deciding how often to give STAR Math, and decide on a frequency that best helps you evaluate individual student interventions. Keep in mind that you are also getting data from Accelerated Math and MathFacts in a Flash on a daily basis, which can help you monitor how your students are doing between STAR Math assessments.

**Why can’t my students use calculators during the test?**

During the STAR Math norming study, students followed this protocol: They could use blank scratch paper and a pencil, but not calculators or reference materials. In order for normative scores to be meaningful, your students must test in the same way.

**Do my students need to be supervised while they take a STAR Math test?**

Yes! For results to be valid, STAR Math must be administered consistently. The testing environment should be free of distractions. The test administrator must read aloud the pretest instructions that are included in the software prior to each student’s first test. Use your judgment as to whether a student needs to hear the instructions every time or on a periodic basis. (Instructions for printing the pretest instructions are on p. 141 in the appendix.)

**Why can’t I see which questions a student missed?**

With computer-adaptive tests, the student’s performance on individual items is not as meaningful as the pattern of responses to the entire test. See Chapter 2, pp. 20-21, for an explanation of how STAR Math test scores are calculated.
Sometimes my students accidently close the Web browser and the test disappears. Is there a way to go back in?

If students close the Web browser or otherwise lose connection to the server, they can log in again and resume the test where they left off. However, they can resume an unfinished test only once, and it must be done within 48 hours. After students log in again, they see a message to click the Start button to restart the test. After clicking, a dialog box opens and you will need to enter the monitor password.

What do I do if a student has to leave class unexpectedly? Is there a way to purposefully stop a test and have the student finish it later?

You can purposefully stop a student’s test by pressing Ctrl+A (Windows) or control+A (Macintosh). Then enter the monitor password. When a test is purposefully stopped, the software does not record a score nor can the student complete it later. Instead, the student must take a new test.

What should I do if a test is interrupted by an emergency, such as a fire drill?

In an emergency situation, when students simply walk away from the computers, time limits take effect and the software reports a score. You will want students to retest quickly, if possible. If students retest before midnight of the same day, only the retest data will be used in score calculations and show up on reports (except the Test Record Report, which displays a history of all tests). However, if a student retests after midnight, the retest is treated as a separate test.

Is it okay to retest a student if I know he or she can do better?

You may retest if you know a student has rushed through a test or not taken it seriously. If the student retests before midnight, only the retest data appears on most reports. If the student tests after midnight, the retest is treated as a separate test.

Where is the “wizard” that I use to set goals for my intervention students?

On the Renaissance Place Home page, scroll to the STAR Math tab and click Screening, Progress Monitoring & Intervention. Then follow the instructions in Chapter 3, pp. 66-68, for defining interventions and goals.

Why can’t the software automatically set a goal for each student in my intervention class?

For a goal to be appropriate, it must be individualized. It’s critical that you take into account each student’s academic history, experience with previous interventions, and other unique characteristics, such as English language proficiency, as well as the intensity of the planned intervention. While the software “knows” the growth rates achieved by students performing at a similar level of math proficiency, only you know these other factors and how they may influence a student’s growth.
Accelerated Math Questions

What should I do when a student “loses” an assignment?
Reprint it. You can choose to include the problems that were on the original assignment or different ones. (Instructions for reprinting assignments are on p. 151 in the appendix.)

I have a hard time keeping track of whether all students are on-task while I’m holding one-on-one conferences. Any ideas?
One idea is to use different colored paper for different tasks. For instance, you could print all regular tests on yellow paper and all diagnostic tests on blue paper. If you have a form for students to use when reworking problems, like the reproducible form on p. 175 in the appendix, you could print those on pink paper. Then if you fill the printer with plain white paper, practice assignments will automatically be white as students print them during class. A glance around the classroom will let you know what each student is working on.

The program is using more paper and toner than I anticipated. What can I do to conserve?
Many teachers find that local businesses are very willing to donate old letterhead or used paper that has only been printed on one side. In addition, changing the font size in the software can allow more problems to appear on each page, which may cut down on the amount of paper needed. Next year, consider the list of supplies you ask parents to provide. Can anything be removed? If so, in its place, consider asking parents to supply a ream of paper for Accelerated Math for Intervention use. To reduce the amount of toner needed, set the printer to draft mode. If your school is considering purchasing new printers, we recommend you buy a duplex printer, which will print assignments on both sides of a piece of paper.

Some of my students hide their TOPS Report if it shows a very low score, and I don’t realize they’ve done this until later. What should I do?
Teach your students a routine that enables you to keep track of who has scored assignments, and ideally one that allows you to quickly check each TOPS Report after it’s printed. For example, when picking up a TOPS Report (and a new assignment if there is one) from the printer, students should staple the report to the scored assignment and any paper that shows their work. Then make sure they show you this stapled packet immediately so you can note their score and have them sign up for a conference if necessary. Place the printer within your sight. During your one-on-one conferences, monitor whether students are coming over to show you their scores by keeping an eye on the activity at the printer. As a regular daily check on these routines, look at the Status of the Class Report, which lists the date of each student’s last scored assignment, to see if you missed seeing any TOPS Reports that day.
I have tried to use Renaissance Responders to score Accelerated Math assignments, but the appropriate screen never appears on the Responder. What should I do?

In order for students to score Accelerated Math assignments, you need: (1) the Renaissance Responder software installed and open on your computer; and (2) a Renaissance Receiver attached to the computer. Instructions for installing the Renaissance Responder software can be found in the Accelerated Math software manual.

MathFacts in a Flash Questions

The program allows students to choose between testing and practicing when they are on the computer. How should I advise my students to proceed?

Students should not test repeatedly without success. Tell students they should test after getting 100 percent correct—or close to 100 percent correct—on a practice.

After students master a level in MathFacts in a Flash, do they need to review? If so, what is the best way to do this?

It is important to review and practice beyond the point of initial mastery. Review helps to build fluency and establish automaticity. MathFacts in a Flash has built-in review levels for each operation and cumulative review levels for multiple operations.

Which levels should students practice on Renaissance Responders?

With Renaissance Responders, students can choose from any of the 40 core addition, subtraction, multiplication, and division MathFacts in a Flash levels. (See p. 154 in the appendix for a complete list of MathFacts in a Flash levels, including those available on the Renaissance Responders.) Practicing at their current level will prepare students for mastery testing on the classroom computer and will allow them to come to you with questions. However, students can also use the Renaissance Responders to attempt a new level or to review levels that they previously mastered.

What if a student makes a mistake and wants to change a response?

When testing, students can change a response, but only to the last problem answered. To change the response, students click Back (on a computer) or press Clear (on a Renaissance Responder). Students cannot change answers on practices.

How can I stop a practice or test on the computer?

Windows: press Ctrl+A
Macintosh: press control+A

Depending on your Monitor Password preference setting, you may be asked to enter a monitor password to stop the practice or test. (Instructions for setting the Monitor Password preference are on p. 147 in the appendix.)
How can a practice or test be stopped on the Renaissance Responders?
First, press Menu, then press yes (True) when the screen asks if you want to exit. Stopped practices and tests will not be saved in the practice/test history.

How do my students send Renaissance Responder data to Renaissance Place?
The student should select MathFacts History on the Responder Menu and then Send to Renaissance Place. This must be done at school where a Renaissance Receiver is connected to the teacher’s computer. The student will be reminded that the data on the Responder will be deleted after the transfer is complete. Once the student chooses to continue, his Responder PIN will be requested.

How do I find my students’ Renaissance Responder PINs?
View or print the Student Information Report for MathFacts in a Flash, making sure the box is checked next to “Print Responder PIN” under the report options. The report will list a nine-digit PIN for each student. (Instructions for printing reports are on p. 146 in the appendix.)

Which MathFacts in a Flash reports include Renaissance Responder data?
You can view your students’ Renaissance Responder practice and test data on the MathFacts in a Flash Student Record Report and Class Progress Report. When generating the reports, be sure to include a Renaissance Responder practice summary under the customization options. Also keep in mind that students must first send Renaissance Responder data to Renaissance Place before you can view it on reports.
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* Reports are regularly reviewed and may vary from those shown as enhancements are made.
Instructions for Common Software Tasks

Renaissance Place Real Time

Log in as a Teacher
1. On the Welcome page, click Teacher/Administrator.
2. Enter your user name and password; then, click Log In.

Access Manuals
1. On the Home page, click Manuals in the upper right corner.
2. Click the name of the manual you wish to view.
3. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser's print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Access Other Resources
1. On the Home page, click Resources under STAR Math, MathFacts in a Flash, or Accelerated Math.
2. Click the name of a resource category.
3. Click the name of the document you wish to view.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser's print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

STAR Math

Before STAR Math Testing

Locate Pretest Instructions and Enter a Monitor Password
1. On the Home page in the STAR Math task list, click Resources.
2. Click Pretest Instructions. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser's print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print. Then, close the Adobe Reader or Macintosh Preview program.
3. Click Done to return to Home.
4. If you wish to change the default setting for the monitor password (ADMIN), click Preferences in the STAR Math task list.
5. Select a class from the drop-down list if necessary. Click Testing Password and enter a new monitor password.
6. Click Save.

Identify Students' User Names and Passwords
1. On the Home page in the STAR Math task list, click Reports.
2. Click Student Information under Other Reports.
3. Select options and click **View Report**.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser's print option.) If the document opens in the Macintosh Preview program, click the File menu and choose **Print**.

**Log in as a Student and Take a STAR Math Test**
1. On the Welcome page, click **Student**.
2. Enter a student user name and password; then, click **Log In**.
3. Under STAR Math, click **Take a Test**.
4. Click the name of a class if necessary.
5. Click **Start**. Enter the monitor password (by default, ADMIN).
6. Stop the test by pressing **Ctrl+A** (Windows) or **control+A** (Macintosh) on the keyboard.

**Adjust a Student’s Starting Level and/or Extend Time Limits**
1. On the Home page in the STAR Math task list, click **Student Settings**.
2. Select a class from the drop-down list if necessary and click **Edit**.
3. To adjust a starting level, enter a Math Instructional Level in the student’s row. Or, to extend time limits for answering questions, click the On box in the student’s row.
4. Click **Save**.

**Defining STAR Math Interventions and Goals**

**Set Up a New Intervention and Goal (initial set up)**
A student must take a STAR test before you can define an intervention and goal.
1. On the Home page in the STAR Math task list, click **Screening, Progress Monitoring & Intervention**.
2. If you are within a screening period, click **Progress Monitoring & Goals**. Otherwise, go to the next step.
3. To select a student, enter student information under “Search for Student” and click **Search**. Click the student’s name.
4. Under the student’s test information, click **Set up intervention and goal for progress monitoring**.
5. Type the name of the intervention.
6. Enter a Goal End Date for the intervention period.
7. Select a Starting Test if necessary using the drop-down list.
8. Select the goal type by clicking the button in front of Moderate or Ambitious, or define a custom goal. To define a custom goal, use the drop-down list to choose Growth Rate, Scaled Score, or Percentile Rank. Then enter the number you would like the student to reach by the end of the intervention period.
9. Click **Calculate Goal** to see the score the student would need to achieve by the end of the intervention period to meet the goal. Or, for a custom goal,
you may see the rate of growth necessary for the student to achieve the score you entered by the end of the intervention period.

10. Click **Save**.

**Edit an Intervention and Goal (all subsequent uses)**

1. On the Home page in the STAR Math task list, click **Screening, Progress Monitoring & Intervention**.
2. If you are within a screening period, click **Progress Monitoring & Goals**. Otherwise, go to the next step.
3. To select a student, enter student information under “Search for Student” and click **Search**. Click the student’s name.
4. Under the student’s latest test information, click **Edit Intervention and Goal**.
5. Choose **Change duration or goal of existing intervention or Set up new intervention and goal**.
6. To change the duration, enter a new date for the Goal End Date.
7. To change the goal type, click the button in front of Moderate or Ambitious, or define a custom goal. To define a custom goal, use the drop-down list to choose Growth Rate, Scaled Score, or Percentile Rank. Then enter the growth rate you want the student to achieve, or the scaled score or percentile rank you would like the student to reach by the end of the intervention period.
8. To set up a new intervention and goal, follow the steps above for “Set Up a New Intervention and Goal (initial set up)."
9. Click **Calculate Goal** to see the score the student would need to achieve by the end of the intervention period to meet the goal. Or, for a custom goal, you may see the rate of growth necessary for the student to achieve the score you entered by the end of the intervention period.
10. Click **Save**.

**Printing STAR Math Reports**

**Create and Print a Student Progress Monitoring Report**

1. On the Home page in the STAR Math task list, click **Screening, Progress Monitoring & Intervention**.
2. Click **Progress Monitoring** under Reports on the left side.
3. Select customization options and click **View Report**.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser's print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

**View and Print Other Reports**

1. On the Home page in the STAR Math task list, click **Reports**.
2. Select a class if necessary using the drop-down list.
3. Click the name of the report you wish to view or print.
5. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

MathFacts in a Flash

Working with MathFacts in a Flash Levels

Add or Remove Levels
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Click Add/Remove under Manage Levels on the left.
3. Check a level to add it, or uncheck a level to remove it. To add all levels on the page, check the Select box at the top of the column. To remove all levels on the page, uncheck the Select box.
4. Click << Previous or Next >> to move through the levels.
5. Click Save.

Reorder Levels
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Click Reorder under Manage Levels on the left.
3. Check the boxes by the levels that you want to move.
4. To move the level or levels up or down in the list, type the number of positions to move in the Move Up or Move Down fields. Then, click Move Up or Move Down.
5. To move the level or levels to a specific position in the list, type the desired position in the Move To field. If you chose more than one level, this will be the position of the first level (numerically) that you chose. Then, click Move To.
6. To return levels to their original order, click Default.
7. Click Save.

Set Levels
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Select one or more students by clicking the box next to each student name.
   To select all students, click the Student box at the top of the column.
3. Click Set Level under Activities on the left.
4. For each student, click the box for the level you wish to set. To set the same level for all students, click the circle by the level number at the top of the column.
5. Click Save.
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Put Levels on Hold
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Select one or more students by clicking the box next to the students’ names. To select all students, click the Student box at the top of the column.
3. Click Hold/Reset under Activities on the left.
4. For each student, click the box for each level you wish to put on hold.
5. Click Hold.

Copy Levels
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Click Copy Levels under Manage Levels on the left.
3. Use the drop-down list to select the class from which you want to copy levels.
4. Click View to see the levels from the chosen class.
5. Click Copy.

Edit Mastery Times for Levels
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Select one or more students by clicking the box next to the students’ names. To select all students, click the Student box at the top of the column.
3. Click Edit Mastery Time under Activities on the left.
4. If you selected one student, edit the mastery time for a level by entering a time in the Minutes and Seconds boxes next to the level’s name and clicking Save; or, edit the mastery time for all levels by entering a time in the Minutes and Seconds boxes at the top of the page and clicking Set All. If you selected multiple students, select each level you wish to edit and then enter the mastery time in the Minutes and Seconds boxes at the top of the page and click Set Time.

Working with Renaissance Responders

Identify Students’ Responder PINs
1. On the Home page in the MathFacts in a Flash task list, click Reports.
2. Click Student Information under Other Reports.
3. Make sure the box next to “Print Responder PIN” is checked under the Responder PIN customization options.
5. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.
Printing MathFacts in a Flash Reports and Practice Materials

Reprint a TOPS Report
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Select the student or students for whom you want to reprint the report.
3. Click TOPS under Reports on the left.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Print Reports
1. On the Home page in the MathFacts in a Flash task list, click Reports.
2. Click the name of the report you wish to view or print.
3. If the report can be customized, choose options on the Report Options page and then click View Report. If applicable, make sure to check options to include practice summaries for Renaissance Responders and/or Renaissance Home Connect.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Print Practice Materials
1. Go to the MathFacts in a Flash Assignment Book for the desired class.
2. Click Print Practice under Activities on the left.
3. Click a worksheet, flash card, or chart name to print. For level practice worksheets and flashcards, first use the drop-down list to choose a level to print. You can also choose the number of problems, orientation of problems, and the number line setting for level practice worksheets.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Working with Time Goals

Edit Time Goals
1. On the Home page in the MathFacts in a Flash task list, click Preferences.
2. Click Time Goals.
3. Make sure the box next to Enable Time Goals is checked.
4. Edit the Minutes and Seconds fields for each of the five goals. You must enter the goals in decreasing order (Goal 1 must be the longest time goal and Goal 5 must be the shortest).
5. To return time goals to their default settings, click Default.
6. Click Save.
**Disable Time Goals**
1. On the Home page in the MathFacts in a Flash task list, click Preferences.
2. Click Time Goals.
3. Uncheck the Enable Time Goals box.
4. Click Save.

**Working with MathFacts in a Flash Preferences**

**Change or View Classroom Preferences**
1. On the Home page in the MathFacts in a Flash task list, click Preferences.
2. Click the link for the preference you wish to change or view (see below).
3. If changing a preference, set the desired customization options and click Save.

- Mandatory Practice: Specify if students will be required to practice after failing their first test on a level.
- Monitor Password: Specify if a monitor password must be entered before a student can cancel a test or mandatory practice, and set the password that must be used.
- Problem Format: Set the practice and test problem format to horizontal, vertical, or a combination of both.
- Student Answer Input: Specify how students must choose or enter their answers on practices and tests.
- Time Goals: Enable and define five decreasing time goals for tests.
- Time-Out: Set the maximum time allowed per test or practice and per problem.
- TOPS Report: Choose when a TOPS Report will print and whether it will include a parent signature line.

**View Benchmark Settings**
1. On the Home page in the MathFacts in a Flash task list, click Preferences.
2. Click Benchmarks under User and School Preferences.
3. Click Cancel to return to the Preferences page.
**Accelerated Math**

**Working with Accelerated Math Objectives**

**Assign an Objective List**

You must assign an objective list to a class or group before you can use it with students. You can either create an objective list in the process of assigning it, or you can select a list that has already been created (either by you—see “Create Objective Lists” below—or by someone else).

1. Go to the Accelerated Math Assignment Book for the desired class and group.
2. View the list options in the light green box on the Assignment Book page. You will see at least two of the following options:
   - *Grade x Objective List.* A default objective list for the Accelerated Math library shown that you cannot change.
   - *An existing objective list.* An objective list already created by Accelerated Math (Library List), by someone else (Shared List), or by you (My List). You can use an existing list without changes or create a copy of the list. If you use an existing list without changes, any changes made to original list by the owner will also affect your list. If you make a copy of the list, any changes made to the original list by the owner will not affect your copy of the list.
   - *New objective list that I will create.* A new objective list that you can change.
3. Choose an option and click *Select.* If you already created an objective list and now want to assign it to a class or group, select “An existing objective list.” If you want to create a new objective list in the process of assigning it, choose “New objective list that I will create.” (For more detailed instructions for all options, please see the Accelerated Math software manual.)
4. If you chose “An existing objective list,” select the existing list, choose whether to make a copy of it, enter a name if necessary, and click *Save.*
5. If you chose “New objective list that I will create,” enter a name for the list and click *Next >.* Then, add objectives to the list by clicking *Add All* to add all of the objectives from a library, or by clicking *Add* to add individual objectives from a library. Click *Done* when you are finished adding objectives.

**Create Objective Lists**

1. On the Home page in the Accelerated Math task list, click *Libraries.*
2. Click *Manage Objectives* under Objective List on the left.
3. Click *Create New List* under Choose Objective List on the left.
4. Enter a name for the objective list and click *Next >.*
5. Add objectives to the list. Click *Add All* to add all of the objectives from a library to the list, or click *Add* to add individual objectives from a library.
6. Click *Done* when you are finished adding objectives.
Print an Objective List Report
1. From the Accelerated Math Assignment Book, click More Reports....
2. Click Objective List.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Assign Objectives to Students
1. From the Accelerated Math Assignment Book, select a student by clicking the box next to the student’s name. To assign objectives to all students, click the box next to Student at the top of the column.
2. Click Assign under Activities on the left.
3. Click the box for each objective you wish to assign.
4. Click Assign.
5. Click Done.

Unassign or Hold Objectives
1. From the Accelerated Math Assignment Book, select a student by clicking the box next to the student’s name. To unassign objectives or put them on hold for all students, click the box next to Student at the top of the column.
2. Click Hold/Unassign/Reset under Activities on the left.
3. Check the box for each objective that you want to unassign or put on hold.
4. Click Unassign or Hold.
5. Click Done.

Reorder Objectives in an Objective List
1. From the Accelerated Math Assignment Book, click Manage Objectives under Objectives on the left.
2. Click Reorder under Manage Objectives on the left.
3. Click Reorder by Objective.
4. Check the boxes by the objectives that you want to move.
5. To move the objective or objectives up or down in the list, type the number of positions to move in the Move Up or Move Down fields. Then, click Move Up or Move Down.
6. To move the objective or objectives to a specific position in the list, type the desired position in the Move To field. If you chose more than one objective, this will be the position of the first objective (numerically) that you chose. Then, click Move To.
7. Click Save.
Add Additional Objectives to the Objective List
1. From the Accelerated Math Assignment Book, click Manage Objectives under Objectives on the left.
2. Click Add/Remove under Manage Objectives on the left.
3. Click Add All to add an entire library or Add to select specific objectives from a library.
4. Click Done.

Working with Accelerated Math Assignments

Print a Practice Assignment
1. From the Accelerated Math Assignment Book, check the box for each student who needs a practice assignment. Or, to select all students, check the box next to Student at the top of the column.
2. Click Print Practice under Activities on the left.
3. Choose the size of the assignment and click Print.
4. If the preference is set to preview assignments before they print, the assignment will open in Adobe Reader (click the buttons to save or print) or the Macintosh Preview program (click the File menu and choose Print).

Print an Exercise
1. From the Accelerated Math Assignment Book, check the box for each student who needs an exercise. Or, to select all students, check the box next to Student at the top of the column.
2. Click Print Exercise under Activities on the left.
3. Under Answer Format, select Assisted-Response (multiple choice) or Free-Response (short answer).
4. Enter the number of problems per objective you wish to include.
5. If you are printing an exercise for more than one student, select Individual or Identical under Problem Generation.
6. If you selected the Identical Free-Response format, choose either a global answer key or individualized answer keys.
7. Check the box next to each objective you wish to include on the exercise.
8. Click Print.
9. If the preference is set to preview assignments before they print, the assignment will open in Adobe Reader (click the buttons to save or print) or the Macintosh Preview program (click the File menu and choose Print).

Print a Regular Test
1. From the Accelerated Math Assignment Book, check the box for each student who needs a regular test. Or, to select all students, check the box next to Student at the top of the column.
2. Click Print Test under Activities on the left.
3. Enter the maximum number of objectives you wish to include.
4. Select Assisted-Response (multiple choice) or Free-Response (short answer).
5. Click Print.
6. If the preference is set to preview assignments before they print, the assignment will open in Adobe Reader (click the buttons to save or print) or the Macintosh Preview program (click the File menu and choose Print).

**Print a Diagnostic Test**
1. From the Accelerated Math Assignment Book, check the box for each student who needs a diagnostic test. Or, to select all students, check the box next to Student at the top of the column.
2. Click **Print Diagnostic** under Activities on the left.
3. Under Answer Format, select Assisted-Response (multiple choice) or Free-Response (short answer).
4. If you are printing a diagnostic test for more than one student, select Individual or Identical under Problem Generation.
5. If you selected the Identical Free-Response format, choose either a global answer key or individualized answer keys.
6. Check the box next to each objective you wish to include on the diagnostic test.
7. Click Print.
8. If the preference is set to preview assignments before they print, the assignment will open in Adobe Reader (click the buttons to save or print) or the Macintosh Preview program (click the File menu and choose Print).

**Reprint or Delete Assignments**
Note: Scored assignments cannot be deleted.
1. From the Accelerated Math Assignment Book, check the box for the student.
2. Click **Reprint/Delete** under Activities on the left.
3. Choose the assignment type and click **Reprint** or **Delete**.
4. If reprinting, choose to print the same problems or different ones; then, click **Reprint**.
5. If the preference is set to preview assignments before they print, the assignment will open in Adobe Reader (click the buttons to save or print) or the Macintosh Preview program (click the File menu and choose Print).

**Score or Rescore an Assignment Manually**
1. From the Accelerated Math Assignment Book, click **Keyboard Score** under Activities on the left.
2. Enter the assignment's form number and click **Score** or **Rescore**.
3. Select answers and click **Save**.
4. Click **Done**.
Work with the Intervene Symbol
1. From the Accelerated Math Assignment Book, click **Intervene** next to the intervene symbol (red) in the Action column.
2. Choose Print Exercise or Print Diagnostic Test and click **Next >**.
3. Select Assisted-Response (multiple choice) or Free-Response (short answer) and, for an exercise, enter the number of problems per objective you wish to include.
4. Click **Print**.
5. If the preference is set to preview assignments before they print, the assignment will open in Adobe Reader (click the buttons to save or print) or the Macintosh Preview program (click the File menu and choose Print).

Printing Accelerated Math Reports and Accessing Resources

Reprint a TOPS Report
1. From the Accelerated Math Assignment Book, select the student or students for whom you want to reprint the report.
2. Click **TOPS** under Reports on the left.
3. If you selected one student, click **Reprint** in the Action column for the assignment. (If more than one student was selected, TOPS Reports will automatically generate for the students’ most recent assignments.)
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Print Reports
1. On the Home page in the Accelerated Math task list, click **Reports**.
2. Click the name of the report you wish to view or print.
3. If the report can be customized, choose options on the Report Options page and then click **View Report**.
4. If the document opens in Adobe Reader, click the Adobe Reader buttons to save or print. (Do not use the browser’s print option.) If the document opens in the Macintosh Preview program, click the File menu and choose Print.

Access the Library Guide and Scope and Sequence
1. On the Home page in the Accelerated Math task list, click **Libraries**.
2. Click the name of the library.
3. In the Library Documentation section, click the title of the document that ends with “LG.PDF” to view the Library Guide. Click the title of the document that ends with “SS.PDF” to view the Scope and Sequence.
**Working with Accelerated Math Preferences**

**Change or View Classroom Preferences**

1. On the Home page in the Accelerated Math task list, click **Preferences**.
2. Click the link for the preference you wish to change or view (see below).
3. If changing a preference, set the desired customization options and click **Save**.

<table>
<thead>
<tr>
<th>Preference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Marking</td>
<td>Choose marking periods to associate with the class.</td>
</tr>
<tr>
<td>Periods</td>
<td></td>
</tr>
<tr>
<td>Page Layout</td>
<td>Set the printing options for assignments.</td>
</tr>
<tr>
<td>Practice</td>
<td>Set the practice durations, default size, and percentage of review problems.</td>
</tr>
<tr>
<td>Printing</td>
<td>Set whether or not to preview assignments before printing, enable duplex printing, and embed fonts.</td>
</tr>
<tr>
<td>Renaissance</td>
<td>Set whether or not students may score practices and exercises through Renaissance Home Connect.</td>
</tr>
<tr>
<td>Home Connect</td>
<td></td>
</tr>
<tr>
<td>Scoring</td>
<td>Set printing and scoring options for AccelScan, Renaissance Responder, NEO 2 and Renaissance Home Connect.</td>
</tr>
<tr>
<td>TOPS Report</td>
<td>Set TOPS Report options, including whether or not to include correct answers.</td>
</tr>
</tbody>
</table>
MathFacts in a Flash Levels

There are 62 levels available in the MathFacts in a Flash software. You can determine a scope and sequence for the levels by adding/removing them, reordering them, or putting them on hold. You can also set starting levels for students in the software, and students will then automatically move through the subsequent levels available to them. Keep in mind that changes you make in the software will not affect the levels available on the Renaissance Responders (in bold below) or in Renaissance Home Connect (all levels).

<table>
<thead>
<tr>
<th>Level #</th>
<th>Level Name</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Addition of 0, 1</td>
</tr>
<tr>
<td>2</td>
<td>Addition of 2, 3</td>
</tr>
<tr>
<td>3</td>
<td>Addition of 4, 5</td>
</tr>
<tr>
<td>4</td>
<td>Alternate Forms: Addition of 0 to 5 *</td>
</tr>
<tr>
<td>5</td>
<td>Review: Addition of 0 to 5</td>
</tr>
<tr>
<td>6</td>
<td>Addition of 6, 7</td>
</tr>
<tr>
<td>7</td>
<td>Addition of 8, 9</td>
</tr>
<tr>
<td>8</td>
<td>Addition of 10</td>
</tr>
<tr>
<td>9</td>
<td>Alternate Forms: Addition of 6 to 10 *</td>
</tr>
<tr>
<td>10</td>
<td>Addition Review 1</td>
</tr>
<tr>
<td>11</td>
<td>Addition Review 2</td>
</tr>
<tr>
<td>12</td>
<td>Subtraction of 0, 1</td>
</tr>
<tr>
<td>13</td>
<td>Subtraction of 2, 3</td>
</tr>
<tr>
<td>14</td>
<td>Subtraction of 4, 5</td>
</tr>
<tr>
<td>15</td>
<td>Alternate Forms: Subtraction of 0 to 5 *</td>
</tr>
<tr>
<td>16</td>
<td>Review: Subtraction of 0 to 5</td>
</tr>
<tr>
<td>17</td>
<td>Subtraction of 6, 7</td>
</tr>
<tr>
<td>18</td>
<td>Subtraction of 8, 9</td>
</tr>
<tr>
<td>19</td>
<td>Subtraction of 10</td>
</tr>
<tr>
<td>20</td>
<td>Alternate Forms: Subtraction of 6 to 10 *</td>
</tr>
<tr>
<td>21</td>
<td>Subtraction Review 1</td>
</tr>
<tr>
<td>22</td>
<td>Subtraction Review 2</td>
</tr>
<tr>
<td>23</td>
<td>Review: +, -</td>
</tr>
<tr>
<td>24</td>
<td>Multiplication by 0, 1</td>
</tr>
<tr>
<td>25</td>
<td>Multiplication by 2, 3</td>
</tr>
<tr>
<td>26</td>
<td>Multiplication by 4, 5</td>
</tr>
<tr>
<td>27</td>
<td>Alternate Forms: Multiplication by 0 to 5 *</td>
</tr>
<tr>
<td>28</td>
<td>Multiplication Review: 0 to 5</td>
</tr>
<tr>
<td>29</td>
<td>Multiplication by 6, 7</td>
</tr>
<tr>
<td>Level #</td>
<td>Level Name</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>30</td>
<td>Multiplication by 8, 9</td>
</tr>
<tr>
<td>31</td>
<td>Multiplication by 10</td>
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<tr>
<td>32</td>
<td>Alternate Forms: Multiplication by 6 to 10 *</td>
</tr>
<tr>
<td>33</td>
<td>Multiplication Review: 6 to 10</td>
</tr>
<tr>
<td>34</td>
<td>Multiplication by 11, 12</td>
</tr>
<tr>
<td>35</td>
<td>Alternate Forms: Multiplication by 11 to 12 *</td>
</tr>
<tr>
<td>36</td>
<td>Multiplication Review 1</td>
</tr>
<tr>
<td>37</td>
<td>Multiplication Review 2</td>
</tr>
<tr>
<td>38</td>
<td>Review: +, -, x</td>
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<tr>
<td>39</td>
<td>Division by 1, 2</td>
</tr>
<tr>
<td>40</td>
<td>Division by 3, 4</td>
</tr>
<tr>
<td>41</td>
<td>Division by 5, 6</td>
</tr>
<tr>
<td>42</td>
<td>Alternate Forms: Division by 1 to 6 *</td>
</tr>
<tr>
<td>43</td>
<td>Division Review: 1 to 6</td>
</tr>
<tr>
<td>44</td>
<td>Division by 7, 8</td>
</tr>
<tr>
<td>45</td>
<td>Division by 9, 10</td>
</tr>
<tr>
<td>46</td>
<td>Alternate Forms: Division by 7 to 10 *</td>
</tr>
<tr>
<td>47</td>
<td>Division Review: 7 to 10</td>
</tr>
<tr>
<td>48</td>
<td>Division by 11, 12</td>
</tr>
<tr>
<td>49</td>
<td>Alternate Forms: Division by 11 to 12 *</td>
</tr>
<tr>
<td>50</td>
<td>Division Review 1</td>
</tr>
<tr>
<td>51</td>
<td>Division Review 2</td>
</tr>
<tr>
<td>52</td>
<td>Review: +, -, x, /</td>
</tr>
<tr>
<td>53</td>
<td>Squares to 15, 20</td>
</tr>
<tr>
<td>54</td>
<td>Squares Review</td>
</tr>
<tr>
<td>55</td>
<td>Review: +, -, x, /, squares</td>
</tr>
<tr>
<td>56</td>
<td>Fractions to Decimals</td>
</tr>
<tr>
<td>57</td>
<td>Decimals to Fractions</td>
</tr>
<tr>
<td>58</td>
<td>Percentages to Decimals</td>
</tr>
<tr>
<td>59</td>
<td>Decimals to Percentages</td>
</tr>
<tr>
<td>60</td>
<td>Fractions to Percentages</td>
</tr>
<tr>
<td>61</td>
<td>Conversion Review</td>
</tr>
<tr>
<td>62</td>
<td>Review: +, -, x, /, squares, conversion</td>
</tr>
</tbody>
</table>

* In alternate forms levels, problems are presented with the blank in any of three possible positions, e.g., $4 + \_ = 6$, $\_ + 2 = 6$, $4 + 2 = \_$. 
Finley, Jason  
ID: JMF3098  
Grade: 7  
Class: 2nd Hour Math  
Teacher: Mr. P. Anderson

This report presents diagnostic information about the student's general skills in mathematics, based on the student's performance on a STAR Math test.

Score Summary

<table>
<thead>
<tr>
<th>SS</th>
<th>GE</th>
<th>PR</th>
<th>PR Range</th>
<th>PR and PR Range</th>
<th>Above Average</th>
<th>NCE</th>
<th>Recommended Accelerated Math™</th>
</tr>
</thead>
<tbody>
<tr>
<td>697</td>
<td>5.4</td>
<td>23</td>
<td>19-25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This student's Grade Equivalent (GE) score is 5.4. His test performance is therefore comparable to that of an average fifth grader after the fourth month of the school year. Jason achieved a national Percentile Rank (PR) of 23. This score is in the below average range and means that Jason scored higher than 23% of students nationally in the same grade. The PR Range indicates that, if this student had taken the STAR Math test numerous times, most of his scores would likely have fallen between 19 and 25. It reflects the amount of statistical variability in a student's PR score.

These scores suggest that Jason knows some fractions and decimals. He needs to practice more in this area. Jason should begin working with fractions with unlike denominators. He should also practice conversion between fractions and decimals. At this time, Jason can also begin learning more advanced number concepts such as square roots. Limit this work to perfect squares of 1 to 12. Finally, he should begin learning exponents. Limit this work to powers of 2 to 10.

At this stage, Jason needs to:
- Continue to work with fractions and decimals
- Practice conversion between fractions and decimals
- Begin to learn adding and subtracting fractions with unlike denominators
- Begin to learn advanced math concepts such as square roots and exponents

The bar charts below reflect Jason's level of proficiency within the Numeration and Computation objectives in STAR Math. The solid black line is pointing to the math skills Jason is currently developing.

Numeration Objectives

<table>
<thead>
<tr>
<th>Ones</th>
<th>Tens</th>
<th>Hundreds</th>
<th>Thousands</th>
<th>Hundred Thousand</th>
<th>Fractions &amp; Decimals</th>
<th>Advanced Concepts I</th>
<th>Advanced Concepts II</th>
</tr>
</thead>
</table>

Computational Objectives

| Addition & Subtraction Basic Facts to 10 | Addition & Subtraction with Regrouping | Addition & Subtraction Basic Facts to 18, No Regrouping | Multiplication & Division Basic Facts | Advanced Computation with Whole Numbers | Advanced Computation with Whole Numbers II | Fractions & Decimals | Fractions & Decimals II | Fractions & Decimals III | Percents, Ratios & Proportions | Multiplication & Division of Mixed Numbers |

If you are using the Accelerated Math management software system with Jason, assign the Grade 5 library. This library should provide a good match for his abilities.

These recommendations rely on analysis of the student's performance on one STAR Math test. Please combine this information with your own knowledge of the student, and use your professional judgment when designing an instructional program.
# Test TOPS for Lisa Stone

**School:** Oakwood Elementary School  
**Class:** Math 4A  
**Teacher:** Mrs. M. Adams  
**Grade:** 4

## Number Correct: 37 / 40 (93%)
**Level:** 11  
**Level Name:** Addition Review 2

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1: 37 of 40 Correct</td>
<td>1 Minute, 39 Seconds</td>
</tr>
<tr>
<td>Goal: 40 of 40 Correct</td>
<td>2 Minutes, 0 Seconds</td>
</tr>
</tbody>
</table>

### Incorrect Problems (3)

<table>
<thead>
<tr>
<th>Incorrect Problems</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 + 6 = 14</td>
<td></td>
</tr>
<tr>
<td>9 + 4 = 13</td>
<td></td>
</tr>
<tr>
<td>8 + 4 = 12</td>
<td></td>
</tr>
</tbody>
</table>

## Number Correct: 38 / 40 (95%)
**Level:** 11  
**Level Name:** Addition Review 2

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 2: 38 of 40 Correct</td>
<td>1 Minute, 41 Seconds</td>
</tr>
<tr>
<td>Goal: 40 of 40 Correct</td>
<td>2 Minutes, 0 Seconds</td>
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</table>

### Incorrect Problems (2)

<table>
<thead>
<tr>
<th>Incorrect Problems</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 + 9 = 17</td>
<td></td>
</tr>
<tr>
<td>8 + 7 = 15</td>
<td></td>
</tr>
</tbody>
</table>

---

**Teacher:**  
**Parent:**

**Comments:**
Diagnostic Test TOPS Report
for Jacob Lee
Printed Tuesday, September 13, 2010 10:26:10AM

School: North Middle School
Class: Math 7A
Teacher: A. Diaz
Grade: 7

Number Correct: 9 / 10 (90%)  Objectives Mastered: 2

Incorrect Responses (1)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Problem</th>
<th>Your Answer</th>
<th>Correct Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Multiply a 1- or 2-digit whole number by a multiple of 10, 100, or 1,000</td>
<td>4</td>
<td>B</td>
<td>D</td>
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</tbody>
</table>

Objectives on this Diagnostic Test (2)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Results</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Round a 4- to 8-digit whole number to a specified place</td>
<td>5 / 5 100%</td>
<td>5 / 5 100%</td>
</tr>
<tr>
<td>2. Multiply a 1- or 2-digit whole number by a multiple of 10, 100, or 1,000</td>
<td>4 / 5 80%</td>
<td>4 / 5 80%</td>
</tr>
</tbody>
</table>

Overall Progress

<table>
<thead>
<tr>
<th>Average Percent Correct</th>
<th>Objective Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice %:</td>
<td>Marking Period (20% Complete)</td>
</tr>
<tr>
<td>Test %:</td>
<td>-</td>
</tr>
<tr>
<td>Review %:</td>
<td>90°</td>
</tr>
</tbody>
</table>

Teacher

Comments:

*Includes Diagnostic Test Results
**Class: 3rd Period Math**

<table>
<thead>
<tr>
<th>Student</th>
<th>ID</th>
<th>Grade</th>
<th>Class</th>
<th>Teacher</th>
<th>Recommended Accelerated Math Library*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bresette, James</td>
<td>JB2933</td>
<td>10</td>
<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 7</td>
</tr>
<tr>
<td>Dacosta, Mercedes</td>
<td>MD2399</td>
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<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 5</td>
</tr>
<tr>
<td>Ellenberger, Brent</td>
<td>BE1293</td>
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<td>3rd Period Math</td>
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<td>Grade 7</td>
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<td>Hammonds, Katie</td>
<td>KH0983</td>
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<td>3rd Period Math</td>
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<td>Grade 7</td>
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<td>Kahl, Wayne</td>
<td>WK3289</td>
<td>10</td>
<td>3rd Period Math</td>
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<td>Grade 6</td>
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<td>Linsenmayer, Joleen</td>
<td>JL3224</td>
<td>10</td>
<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 5</td>
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<td>Miranda, Olivia</td>
<td>OM3563</td>
<td>10</td>
<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 6</td>
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<tr>
<td>Ortega, Marcoo</td>
<td>MO4483</td>
<td>10</td>
<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 5</td>
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<tr>
<td>Radzicki, Rob</td>
<td>RR3123</td>
<td>10</td>
<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 4 or Grade 5</td>
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<td>Tuccinardi-Lehman, Tucker</td>
<td>TT1129</td>
<td>10</td>
<td>3rd Period Math</td>
<td>Taylor, Doug</td>
<td>Grade 7</td>
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**Library Recommendations**

<table>
<thead>
<tr>
<th>Accelerated Math Library</th>
<th>Number of Students</th>
<th>Percent of Total</th>
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<tbody>
<tr>
<td>Grade 4 or Grade 5</td>
<td>1</td>
<td>10.0</td>
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<tr>
<td>Grade 5</td>
<td>3</td>
<td>30.0</td>
</tr>
<tr>
<td>Grade 6</td>
<td>2</td>
<td>20.0</td>
</tr>
<tr>
<td>Grade 7</td>
<td>4</td>
<td>40.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*These recommendations rely on analysis of the student's performance on one STAR Math test. Please combine this information with your own knowledge of the student, and use your professional judgment when designing an instructional program. Historical data included.*
# Class Progress Report

**School:** Evergreen Middle School  
**Printed:** Tuesday, October 12, 2010 3:30:15 PM  
**Reporting Period:** 9/1/2010 - 10/12/2010  
(1st Quarter)

## Report Options
- Reporting Parameter Group: All Demographics [Default]
- Group By: Class
- Sort By: Last Name

## Class: 1st Period Math
**Teacher:** Zimmer, Leslie

<table>
<thead>
<tr>
<th>Student</th>
<th>Current Level</th>
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<tbody>
<tr>
<td></td>
<td>Level</td>
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<tr>
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<td></td>
<td>Session</td>
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<tr>
<td></td>
<td></td>
<td>Type</td>
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<tr>
<td>Bailey, Edward</td>
<td>19. Review: +, -</td>
<td>10/11/10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10/11/10</td>
</tr>
<tr>
<td>Breunig, Lisa</td>
<td>21. Multiplication by 2, 3</td>
<td>10/08/10</td>
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<td>10/08/10</td>
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<tr>
<td>Demaroney, Cheyanne</td>
<td>16. Subtraction of 10</td>
<td>10/07/10</td>
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<tr>
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<td>10/07/10</td>
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<tr>
<td>Fischbeck, Kenneth</td>
<td>17. Subtraction Review 1</td>
<td>10/11/10</td>
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<tr>
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<td></td>
<td>10/11/10</td>
</tr>
<tr>
<td>Gomez, Hector</td>
<td>20. Multiplication by 0, 1</td>
<td>10/12/10</td>
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<tr>
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<td></td>
<td>10/12/10</td>
</tr>
<tr>
<td>Kedrowski, Michelle</td>
<td>23. Multiplication Review: 0 to 5</td>
<td>10/09/10</td>
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<tr>
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<td>10/09/10</td>
</tr>
<tr>
<td>Marshall, Amaya</td>
<td>24. Multiplication by 6, 7</td>
<td>10/12/10</td>
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<tr>
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<td></td>
<td>10/12/10</td>
</tr>
<tr>
<td>Nachazel, James</td>
<td>22. Multiplication by 4, 5</td>
<td>10/11/10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10/11/10</td>
</tr>
<tr>
<td>Perez, Miguel</td>
<td>27. Multiplication Review: 6 to 10</td>
<td>10/11/10</td>
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<tr>
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<td></td>
<td>10/11/10</td>
</tr>
<tr>
<td>Sorensen, Jennifer</td>
<td>21. Multiplication by 2, 3</td>
<td>10/12/10</td>
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<tr>
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<td></td>
<td>10/12/10</td>
</tr>
<tr>
<td>Stream, Heidi</td>
<td>20. Multiplication by 0, 1</td>
<td>10/08/10</td>
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<td></td>
<td>10/08/10</td>
</tr>
<tr>
<td>Valkaskey, Greg</td>
<td>15. Subtraction Review 2</td>
<td>10/12/10</td>
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<tr>
<td></td>
<td></td>
<td>10/12/10</td>
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## Class Summary
- **Number of Students:** 12

<table>
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<tr>
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<th>Number of Levels Mastered</th>
<th>Best Time Attempts</th>
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<tbody>
<tr>
<td><strong>Average</strong></td>
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## Class: 1st Period Math

### Renaissance Home Connect Practice Summary

<table>
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<th>Number of Practices</th>
<th>Total</th>
<th>Number of Tests</th>
<th>Total</th>
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<tr>
<td>10</td>
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### Renaissance Responder Practice Summary

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<th>Number of Tests</th>
<th>Total</th>
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<tbody>
<tr>
<td>12</td>
<td>713</td>
<td>302</td>
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- Students who did not use Renaissance Home Connect: 2
- Gomez, Hector, Shilani, Heidi
- Students who did not send Renaissance Responder practice data: 0

### Status of the Class Report

**Class:** 3rd Period Math  
**Teacher:** Miller, Katrina

#### Assignment Status

<table>
<thead>
<tr>
<th>Student</th>
<th>Assignment Date</th>
<th>Type</th>
<th>Last Assignment Completed</th>
<th>Overall Results</th>
</tr>
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<tbody>
<tr>
<td>Bristol, Andrew</td>
<td>03/14/11</td>
<td>Diagnostic Test</td>
<td>03/14/11</td>
<td>0</td>
</tr>
<tr>
<td>Colbert, Janet</td>
<td>03/11/11</td>
<td>Regular Test</td>
<td>03/14/11</td>
<td>0</td>
</tr>
<tr>
<td>Foker, Jeffrey</td>
<td>03/14/11</td>
<td>Exercise</td>
<td>03/14/11</td>
<td>0</td>
</tr>
<tr>
<td>Hazen-Gray, Kassie</td>
<td>03/11/11</td>
<td>Practice</td>
<td>03/14/11</td>
<td>0</td>
</tr>
<tr>
<td>Jimenez, Julio</td>
<td>03/14/11</td>
<td>Practice</td>
<td>03/14/11</td>
<td>0</td>
</tr>
<tr>
<td>Lakham, Angie</td>
<td>03/11/11</td>
<td>Regular Test</td>
<td>03/14/11</td>
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<td>Manion, Angore</td>
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<td>Patakirov, Gerson</td>
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<td>Waverock, Steven</td>
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<td>Practice</td>
<td>03/14/11</td>
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</table>

#### Intervention Needed

- **Intervention (1):** Practice  
- **Intervention (2):** Practice

#### Objectives Causing Difficulties

1. WP: Divide a whole number, with remainder
2. WP: Determine equivalent fractions
3. WP: Use a line graph to represent data
4. WP: Divide whole number, no remainder

#### Library Objective Code

- DMG4-104
- DMG5-023
- DMG5-033
- DMG6-039

---

**Minimum Students:** 2

**Overall Results:**

- 4/10 (40%)
- 6/18 (33%)
- 5/10 (50%)
- 7/12 (58%)
Status of the Class Report
Printed Monday, March 14, 2011 2:54:21 PM

School: Evergreen Middle School

Objectives Causing Difficulties
Minimum Students: 2

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<tr>
<th>Objectives</th>
<th>Assignment Type</th>
<th>Student</th>
<th>Library Objective Code</th>
<th>Overall Results</th>
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</thead>
<tbody>
<tr>
<td>44. Use a line graph to represent data</td>
<td>Practice</td>
<td>Colbert, Janet</td>
<td>DMG4-136</td>
<td>8 / 12 (67%)</td>
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<td></td>
<td>Review</td>
<td>Stabler, Kyle</td>
<td>DMG4-138</td>
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Outstanding Assignments

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<thead>
<tr>
<th>Student</th>
<th>School Days Since Last Work Printed</th>
<th>Practice</th>
<th>Exercise</th>
<th>Test</th>
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<tr>
<td></td>
<td>Form</td>
<td>Problems</td>
<td>Date Printed</td>
<td>Form</td>
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<tr>
<td>Bristol, Andrew</td>
<td>Today</td>
<td>6487</td>
<td>17-36</td>
<td>03/14/11</td>
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<tr>
<td>Colbert, Janet</td>
<td>Today</td>
<td>6453</td>
<td>1-16</td>
<td>03/11/11</td>
</tr>
<tr>
<td>Floeter, Jeffrey</td>
<td>1</td>
<td>6342</td>
<td>21-40</td>
<td>03/14/11</td>
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<tr>
<td>Hazen-Gray, Kassie</td>
<td>Today</td>
<td>6323</td>
<td>1-6</td>
<td>03/11/11</td>
</tr>
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<td>Jimenez, Julio</td>
<td>Today</td>
<td>6534</td>
<td>21-40</td>
<td>03/11/11</td>
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<tr>
<td>Lanham, Angie</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mesdijian, Kavork</td>
<td>Today</td>
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<td></td>
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<td>Pawlowsky, Jessica</td>
<td>Today</td>
<td></td>
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<tr>
<td>Schnabel, Tamora</td>
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<tr>
<td>Stabler, Kyle</td>
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<tr>
<td>Thieman, Shelly</td>
<td>Today</td>
<td></td>
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<tr>
<td>Westenbroek, Steven</td>
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Class Summary

<table>
<thead>
<tr>
<th>Action Summary</th>
<th>Total</th>
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<tbody>
<tr>
<td>Students Need Assignments Printed</td>
<td>1</td>
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<tr>
<td>Students Need Objs Assigned</td>
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<tr>
<td>Students Need Tests Printed</td>
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<tr>
<td>Students Need Intervention</td>
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<tr>
<td>Objectives with two or more students experiencing difficulty</td>
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</table>

<table>
<thead>
<tr>
<th>Outstanding Assignments</th>
<th>Total</th>
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<tbody>
<tr>
<td>Practices</td>
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<td>Exercises</td>
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<tr>
<td>Regular Tests</td>
<td>2</td>
</tr>
<tr>
<td>Diagnostic Tests</td>
<td>4</td>
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</tbody>
</table>

* Diagnostic Test
# Diagnostic Report

**School:** Prairie Ridge High School  
**Printed Monday, November 2, 2009 3:30:09PM**  
**Reporting Period:** 9/1/2009 - 11/2/2009  
(2009-2010)

**Report Options**  
Reporting Parameter Group: All Demographics [Default]  
Group By: Class

## Class: 7th Hour Math  
Teacher: Hernandez, Maria

<table>
<thead>
<tr>
<th>Student</th>
<th>Diagnostic Codes</th>
<th>Average Percent Correct</th>
<th>Engaged Time*</th>
<th>Objectives Mastered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Practice</td>
<td>Exercise</td>
<td>Regular Test</td>
<td>Diagnostic Test</td>
</tr>
<tr>
<td>Carter, Juan</td>
<td>77</td>
<td>-</td>
<td>86</td>
<td>86</td>
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<tr>
<td>Evans, Kimberly</td>
<td>82</td>
<td>-</td>
<td>88</td>
<td>90</td>
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<tr>
<td>Harrington, Abbey</td>
<td>79</td>
<td>-</td>
<td>87</td>
<td>88</td>
</tr>
<tr>
<td>Hill, Monica</td>
<td>75</td>
<td>-</td>
<td>86</td>
<td>85</td>
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<tr>
<td>Jensen, Christopher</td>
<td>77</td>
<td>-</td>
<td>85</td>
<td>86</td>
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<td>Morris, Heidi</td>
<td>78</td>
<td>-</td>
<td>85</td>
<td>87</td>
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<tr>
<td>Mullins, Warren</td>
<td>76</td>
<td>-</td>
<td>85</td>
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<tr>
<td>Neal, Kristina</td>
<td>69 (↓)</td>
<td>-</td>
<td>84 (↓)</td>
<td>82</td>
</tr>
<tr>
<td>Petersen, Kent</td>
<td>75</td>
<td>-</td>
<td>88</td>
<td>87</td>
</tr>
<tr>
<td>Reed, Shawn</td>
<td>74 (↓)</td>
<td>-</td>
<td>85</td>
<td>84</td>
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<tr>
<td>Sanchez, Antonio</td>
<td>75</td>
<td>-</td>
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<td>85</td>
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<tr>
<td>Stewart, Leticia</td>
<td>80</td>
<td>-</td>
<td>87</td>
<td>88</td>
</tr>
<tr>
<td>Trevino, Derek</td>
<td>78</td>
<td>-</td>
<td>87</td>
<td>86</td>
</tr>
<tr>
<td>Vargas, Carmen</td>
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<td>-</td>
<td>85</td>
<td>87</td>
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<tr>
<td><strong>Average</strong></td>
<td>77</td>
<td>-</td>
<td>86</td>
<td>86</td>
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</tbody>
</table>

## Diagnostic Code Summary

<table>
<thead>
<tr>
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<th>% of Students</th>
<th>Diagnostic Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>I</td>
<td>Teacher intervention needed (see Status of the Class Report)</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>P</td>
<td>Practice percentage lower than 75%</td>
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<tr>
<td>1</td>
<td>7</td>
<td>T</td>
<td>Regular Test percentage lower than 85%</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>R</td>
<td>Review percentage lower than 80%</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>M</td>
<td>Less than 1/2 of the median objectives mastered (1/2 the median = 29)</td>
</tr>
</tbody>
</table>

**Students At Risk:** 2 of 14 (14%)

---

*Trouble value  
*Engaged Time per Day: An estimate based on number of objectives mastered and an anticipated 40 minutes per day of math practice.
<table>
<thead>
<tr>
<th>Level Name</th>
<th>Last Test Date</th>
<th>Accuracy</th>
<th>Mastery Time Goal</th>
<th>Number of Practices</th>
<th>Number of Tests</th>
<th>Best Time Attempts</th>
<th>Best Time</th>
<th>Date of Best Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. Multiplication Review: 0 to 5</td>
<td>10/12/10</td>
<td>38/40</td>
<td>1:49</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1:37</td>
<td>06/02/10</td>
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</table>

**Kedrowski, Michelle**

Class: 1st Period Math
Teacher: Zimmerv

**Current Level**

**Levels Mastered**

<table>
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<tr>
<th>Level</th>
<th>Date</th>
<th>Mastered Level</th>
<th>Start Date</th>
<th>Mastered Level</th>
<th>Start Date</th>
<th>Best Time</th>
<th>Date of Best Time</th>
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</thead>
<tbody>
<tr>
<td>1. Addition of 0, 1</td>
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<td>08/01/10</td>
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<td>08/02/10</td>
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<tr>
<td>2. Addition of 2, 3</td>
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<td>08/02/10</td>
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<td>08/02/10</td>
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</tr>
<tr>
<td>3. Addition of 4, 5</td>
<td>08/03/10</td>
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<td>08/03/10</td>
<td>2</td>
<td>08/03/10</td>
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<tr>
<td>4. Addition of 6, 7</td>
<td>08/04/10</td>
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<td>08/04/10</td>
<td>2</td>
<td>08/04/10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Addition of 8, 9</td>
<td>08/05/10</td>
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<td>08/05/10</td>
<td>2</td>
<td>08/05/10</td>
<td></td>
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<tr>
<td>6. Addition of 10</td>
<td>08/06/10</td>
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<td>08/06/10</td>
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<tr>
<td>7. Addition Review 1</td>
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<td>08/07/10</td>
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<td>8. Addition Review 2</td>
<td>08/08/10</td>
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<td>08/08/10</td>
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<td>9. Addition Review 3</td>
<td>08/09/10</td>
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<td>08/09/10</td>
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<td>10. Subtraction of 0, 1</td>
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<td>08/10/10</td>
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<td>08/10/10</td>
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<td>11. Subtraction of 2, 3</td>
<td>08/11/10</td>
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<td>08/11/10</td>
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<tr>
<td>12. Subtraction of 4, 5</td>
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<td>08/12/10</td>
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<td>08/12/10</td>
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<td>13. Subtraction of 6, 7</td>
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<td>08/13/10</td>
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<td>08/13/10</td>
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<td>14. Subtraction of 8, 9</td>
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<td>08/14/10</td>
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<td>08/14/10</td>
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<td>15. Subtraction of 10</td>
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<td>08/15/10</td>
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<td>08/15/10</td>
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<td>08/16/10</td>
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<td>08/16/10</td>
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<td>17. Subtraction Review 2</td>
<td>08/17/10</td>
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<td>08/17/10</td>
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<td>18. Subtraction Review 3</td>
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<td>08/18/10</td>
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<tr>
<td>19. Review: +, -</td>
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<td>08/19/10</td>
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</table>

**MathFacts in a Flash**

School: Evergreen Middle School
Report Card Group: All Demographics [Default]
Grade: 5

**Student Record Report**

Printed Tuesday, October 12, 2010 3:32:41 PM

**Reporting Period: 06/01/2010 - 10/12/2010 (1st Quarter)**
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<th>Level</th>
<th>Practice/Tests</th>
<th>Start Date</th>
<th>End Date</th>
<th>Days to Mastery</th>
<th>Best Time</th>
<th>Attempts</th>
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<tbody>
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<td>08/30/10</td>
<td>10/04/10</td>
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<td>2.00</td>
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<tr>
<td>21</td>
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<td>10/04/10</td>
<td>10/07/10</td>
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<td>2.00</td>
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<td>10/12/10</td>
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<td>2.00</td>
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<th>Levels Mastered</th>
<th>Total Levels Mastered</th>
<th>Average Days to Master</th>
<th>Average Number of Practices</th>
<th>Average Number of Tests</th>
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<table>
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<th>Level</th>
<th>Practice/Tests</th>
<th>Start Date</th>
<th>End Date</th>
<th>Days to Mastery</th>
<th>Best Time</th>
<th>Attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
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<td>10/09/10</td>
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<td>2.84</td>
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</table>
### Renaissance Responder Practice
Practices and tests taken using the Renaissance Responder do not count toward level mastery.

<table>
<thead>
<tr>
<th>Level</th>
<th>Last Date Sent</th>
<th>Number of Practices</th>
<th>Number of Tests</th>
<th>Best Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Addition of 0, 1</td>
<td>09/03/10</td>
<td>3</td>
<td>1</td>
<td>1:43</td>
</tr>
<tr>
<td>2. Addition of 2, 3</td>
<td>09/03/10</td>
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<td>1</td>
<td>1:37</td>
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<tr>
<td>3. Addition of 4, 5</td>
<td>09/03/10</td>
<td>1</td>
<td>1</td>
<td>1:44</td>
</tr>
<tr>
<td>4. Review: Addition of 0 to 5</td>
<td>09/03/10</td>
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<td>1:50</td>
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<tr>
<td>5. Addition of 6, 7</td>
<td>09/03/10</td>
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Student Progress Monitoring Report

School: Lincoln Middle School  Reporting Period: 9/1/2010-6/10/2011
(School Year)

Smith, Avery
Grade: 8  Class: Math Concepts 8
ID: AS234987  Teacher: Reede, M.

Avery's Current Goal
Goal: 747 SS (Moderate)  Goal End Date: 5/25/2011  Expected Growth Rate: 1.3 SS/Week
Student Progress Monitoring Report

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ID: AS234987
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Goal: 747 SS (Moderate)  Goal End Date: 5/25/2011  Expected Growth Rate: 1.3 SS/Week

Avery's Progress

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*Fluctuation of scores is typical with any test administered multiple times within a short period. Focus on the general direction emerging after multiple administrations of the test rather than on the ups and downs between individual scores. The student’s trend line and growth rate appear on the report after taking five tests.
## Growth Report

**School:** Mellem Elementary School
**Pretest Dates:** 09/13/2010 - 09/17/2010
**Posttest Dates:** 05/23/2011 - 05/27/2011

### Class: Mrs. Hudson’s Math

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*Teacher's Guide to Accelerated Math for Intervention*
Class: Math 4A

Growth Summary

Pretest  Posttest

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Pretest Dates: 09/13/2010 - 09/17/2010
# MathFacts in a Flash All-Level Mastery Tracker

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**MathFacts in a Flash Practices and Tests Chart**

**Level Number:_______**  
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If you have taken 5 tests without mastering this level, please see your teacher.

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<td>Describe what you did incorrectly the first time you did the problem</td>
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The Research Foundation of Accelerated Math for Intervention

The white paper that follows is reproduced in its entirety.
Accelerated Math and MathFacts in a Flash are highest rated for progress-monitoring mastery measurement by the National Center on Response to Intervention, with perfect scores in all categories.

STAR Math is highest rated for math screening and progress monitoring by the National Center on Response to Intervention, with perfect scores in all categories.

Accelerated Math and STAR Math meet all criteria for scientifically based progress-monitoring tools set by the National Center on Student Progress Monitoring.

Accelerated Math has earned the top rating for Prevention and Intervention at all grade levels from the National Dropout Prevention Center.
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Introduction

"I just can't do math!" Teachers and parents hear it time and time again. Some of us have likely even said it ourselves at some point. The problem with this statement is that it is simply not true. "Learning mathematics does not come as naturally as learning to speak, but our brains do have the necessary equipment" and it can be done—it just takes time, effort, and practice (Willingham, 2009–10, p. 14). Students struggling with math may feel they just "weren't born to do math" because no matter how hard they try, they cannot do the work. and before long, these feelings result in low motivation and lack of engagement related to math, making the challenge for educators that much greater.

The good news is that the difficulties with mathematics so many students suffer from are not caused by lack of either smarts or the mythical "math gene" (dehaene, 1999). for most students that struggle, the problem lies in not having fully mastered the previous knowledge. Students struggling with math likely received instruction on the skills they are lacking, but they may not have spent enough time practicing them to reach mastery and/or their struggles went unnoticed as the class moved on to the next lesson. "Because math is highly proceduralized and continually builds on previous knowledge for successful learning, early deficits have enduring and devastating effects on later learning" (VanderHeyden, 2009, p. 5).

To successfully tackle any new math skill, a student needs to have mastered the prerequisite skills—but this takes time, effort, and practice. for example, in order to do double-digit division, a student needs knowledge of basic facts, concepts, and procedures related to division, multiplication, and subtraction. and these prerequisite skills, in turn, have their own prerequisites. Students that are either partially or completely lacking proficiency in some important prerequisite skills are going to struggle with grade-level material at some point—and they are at risk of falling farther and farther behind without intervention. a robust intervention is needed that will identify what each student knows while providing teachers with the time and tools necessary to efficiently build upon students' existing skills to bring them up to grade level.

Low performance + disappointing growth

Figure 1 shows the 2009 results from the national assessment of Educational Progress (naEP), called the "nation's report card," which found u.S. fourth graders had made no learning gains since the last time the naEP math test was given, in 2007, while u.S. eighth graders showed slight progress (national center for Education Statistics, 2009). Even with the eighth graders' modest improvement, overall results show that

| Grade 4 | Grade 8 | Grade 12 *
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*The NAEP assessment was last administered to Grade 12 in 2005.
Introduction

“*I just can’t do math!*” Teachers and parents hear it time and time again. Some of us have likely even said it ourselves at some point. The problem with this statement is that it is simply not true. “Learning mathematics does not come as naturally as learning to speak, but our brains do have the necessary equipment” and it can be done—it just takes time, effort, and practice (Willingham, 2009–10, p. 14). Students struggling with math may feel they just “weren’t born to do math” because no matter how hard they try, they cannot do the work. And before long, these feelings result in low motivation and lack of engagement related to math, making the challenge for educators that much greater.

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![Figure 1: NAEP Math Results 2005, 2009*](image-url)
proficiency levels decline as students move through the grades. Less than 40% of U.S. math students in fourth grade and less than 35% in eighth grade display “proficiency,” defined as “competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter” (Winick et al., 2008). By 12th grade, NAEP results show that less than one quarter, only 23%, of U.S. math students are at or above proficiency (Grigg, Donahue, & Dion, 2007).

U.S. students are also not performing competitively in mathematics compared to students internationally (see Table 1). The 2006 mathematics results from the Program for International Student Assessment (PISA), a system of international assessments focused on 15-year-olds’ capabilities in reading, mathematics, and science, show that students in 23 out of 29 participating Organization for Economic Co-operation and Development (OECD) countries outperformed their U.S. peers (Baldi, Jin, Skemer, Green, & Herget, 2007). These results place the U.S. in the bottom quartile, a position that has remained relatively unchanged since 2003 (Provasnik, Gonzales, & Miller, 2009).

**Table 1: OECD Rankings on 2006 PISA Mathematics Test**

<table>
<thead>
<tr>
<th>Above OECD Average</th>
<th>OECD Average</th>
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<td>United States</td>
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<td>Japan</td>
<td>Poland</td>
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Finally, U.S. students are graduating high school without sufficient mathematics proficiency to be college and career ready. Results from the 2009 ACT exam, designed to measure academic skills taught in schools and deemed important for success in first-year college courses, show only 42% of students are prepared for college-level coursework in mathematics, down 1 percent from 2008 (The ACT, 2009).

Clearly, such consistently lackluster performance on national and international measures indicates the U.S. student math problem is systemic. It is time to intervene. But first, a closer look at what it means to be struggling with mathematics.

**What is mathematics proficiency?**

Mathematics proficiency is of critical importance, both to succeed academically and ultimately for success in life. Experts describe proficiency as “five interrelated strands of knowledge, skills, abilities, and beliefs that allow for mathematics manipulation and achievement across all mathematical domains”: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition (Steedly, Dragoo, Arefeh, & Luke, 2008, p. 10; see also National Research Council, 2001; Figure 2).

**Figure 2: Five Strands of Math Proficiency**

1. Conceptual understanding: comprehension of mathematical concepts, operations, and relations
2. Procedural fluency: ability to carry out procedures flexibly, accurately, efficiently, and appropriately
3. Strategic competence: ability to formulate, represent, and solve mathematical problems
4. Adaptive reasoning: capacity for logical thought, reflection, explanation, and justification
5. Productive disposition: habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy

(National Research Council, 2001, p. 5)
For students to learn successfully, these interconnected strands must work together. “For example, as a student gains conceptual understanding, computational procedures are remembered better and used more flexibly to solve problems. In turn, as a procedure becomes more automatic, the student is enabled to think about other aspects of a problem and to tackle new kinds of problems, which leads to understanding” (National Research Council, 2002, p. 17).

The phrase students struggling with mathematics does not have a specific, formal definition, but broadly speaking it may be thought of as those students who are unable to meet state grade-level standards. And teachers are likely to define struggling students as those who struggle to keep up with grade-level assignments, perform poorly on math assessments, and/or are perceived as needing extra help (Louie, Brodesky, Brett, Yang, & Tan, 2008).

**Accelerated Math for Intervention is evidence based to help students succeed**

Because we learn new skills in the context of what we already know (Willingham, 2009), it is safe to assume that students struggling with mathematics are missing critical foundational skills that, in math, form the background knowledge needed to successfully complete grade-level work. In addition, these students have likely not mastered math facts automatically—the automatic recall of math facts that frees students to concentrate on more complex mathematical tasks. Without a robust intervention to identify what students know and what they need to master in order to build a foundation for learning grade-level material, it is nearly impossible to help them catch up to their peers and experience success in a core mathematics course.

Accelerated Math for Intervention is a dynamic, evidence-based math intervention for grades 3–12 that provides diagnostic tools to help teachers identify both students’ strengths and critical skills deficiencies. At the heart of the program are three proven Renaissance Learning tools for differentiating student math practice: Accelerated Math, MathFacts in a Flash, and the STAR Math assessment. Working in concert and supported by professional development, these tools help teachers implement a formative assessment process within their intervention framework, allowing them to deliver targeted instruction based on data about the specific skills students are lacking mastery in and provide invaluable time for differentiated student math practice, with feedback, of these same skills.

**Increasing time for learning**

Academic Learning Time (ALT)—the amount of time students spend on actual learning activities—has long been identified as a critical contributor to academic growth (Batsche, 2007; Berliner, 1991; Gettinger & Stoiber, 1999; Karweit, 1982). An important, but often underemphasized, aspect of ALT is time for student practice of learned skills—which is as important as explicit instruction (Szadokierski & Burns, 2008). Since ALT is the time when most learning actually takes place, increasing ALT is a powerful tool for improving academic results (Aronson, Zimmerman, & Carlos, 1998; Berliner, 1978; Smith, 1998). The challenge is that in order to increase ALT it is necessary to directly measure and manage it, which is exceedingly difficult, especially in a diverse classroom where learners are working at many different levels at the same time.
Accelerated Math for Intervention overcomes this difficulty, and increases learning time, by focusing on the four components of ALT that distinguish it from simple measures of classroom time or “time on task”:

1. **Students are actually engaged with material:** The personalized problem sets of Accelerated Math and the highly interactive nature of MathFacts in a Flash engage students, while providing an immediate and direct measurement of how much instructional time each student actually devoted to the work.

2. **Material is at the proper level of challenge, or zone of proximal development (ZPD):** Assessment via STAR Math and ongoing measurement of results from Accelerated Math and MathFacts in a Flash ensure that each assignment is tailored to each student’s ZPD, which is continuously recalculated as the student progresses.

3. **Students experience a high rate of success:** Accelerated Math and MathFacts in a Flash generate personalized assignments at a level calculated for high success rates, which are automatically monitored.

4. **Both student and teacher receive regular feedback about performance:** Both Accelerated Math and MathFacts in a Flash instantly provide students with results on their assignments, and teachers receive concise, real-time reports so they know each student is progressing satisfactorily and can intervene promptly when necessary.

The management and measurement functions of Accelerated Math for Intervention amount to direct control over increasing ALT—for virtually the first time in educational history.

**Getting students back on the track to success**
The goal of any intervention is to get struggling students back on grade level and performing successfully in the general classroom as quickly as possible. Because no two students have the same learning profile, Accelerated Math for Intervention helps teachers make the best use of limited time and resources.

Student work in the program is closely monitored by the teacher to ensure they are always working at an appropriate level of challenge, receiving immediate feedback, and experiencing success—with prompt intervention when difficulties arise.

Accelerated Math for Intervention helps students develop self-efficacy and self-confidence in math as well as personal responsibility for learning and success. And for teachers, the program provides technology and professional development to create and support an environment where instruction is truly targeted to students’ needs.

Accelerated Math for Intervention is built around the following research-based principles:

- Targeted instruction with differentiated student practice
- Critical math skills mastery
- Motivation and engagement
- Informative assessment

---

1 A student’s ZPD, a theoretical concept inspired by Russian psychologist Lev Vygotsky (1978), is based on an appropriate level of difficulty—neither too easy nor too hard—where the student is challenged without being frustrated.
A section of this paper is devoted to each of these principles, including a summary of comprehensive evidence from experts and results of research studies called, “What the research says,” as well as an explanation of how the intervention carries out these research findings titled, “Putting the research into practice with Accelerated Math for Intervention.”

For those familiar with Response to Intervention (RTI), it will be clear that the data-rich nature of Accelerated Math for Intervention (and likewise Accelerated Math) makes this program a perfect fit for an RTI framework where teachers need to be able to monitor a student’s response to assistance and make informed decisions based on that response. As a small-group intervention, it will commonly be most appropriate for use at RTI Tiers 2 or above.
Targeted Instruction With Differentiated Student Practice

With Accelerated Math for Intervention, teachers use formative feedback from individualized student practice to target instruction matched to students’ specific prerequisite skills deficiencies. Because the key to math skill mastery is having time to practice skills that have been taught, Accelerated Math for Intervention provides students with deliberate, differentiated practice at an appropriate challenge level and aligned to students’ unique needs.

What the research says
Because no two students are identical, the first important step in serving struggling learners is to determine why each student has been struggling—in this case, with grade-level mathematics. Given the sequential nature of mathematics, once a student misses mastering an underlying prerequisite skill, it becomes more and more difficult to master subsequent skills. The more gaps in knowledge, the more likely it is that these missing skills will impede a student’s success. As noted previously, these gaps are likely due to a lack of competence in the five interrelated strands of mathematical proficiency (conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition), though some strands may be weaker than others.

Once tasks are matched to the capability of each student, they need extensive opportunities for practice, along with constant feedback on their performance.

(VanDerHeyden, n.d.)

Students struggling with mathematics may need intervention in one or a combination of these areas, but as the National Mathematics Advisory Panel (2008b) notes,

Debates regarding the relative importance of conceptual knowledge, procedural skills (e.g., the standard algorithms), and the commitment of addition, subtraction, multiplication, and division facts to long-term memory are misguided. These capabilities are mutually supportive, each facilitating learning of the others. Conceptual understanding of mathematical operations, fluent execution of procedures, and fast access to number combinations together support effective and efficient problem solving. (p. 26)

Once skills gaps are identified, research shows that explicit, systematic instructional strategies are the most effective for students struggling in mathematics (National Council of Teachers of Mathematics [NCTM], 2007). The Institute of Education Sciences (IES) Practice Guide (Gersten, Beckmann, et al., 2009) lists providing the following as vital to instruction during intervention:

- Models of proficient problem solving
- Verbalization of thought processes
- Guided practice
- Corrective feedback
- Cumulative review

Targeted instruction
It is important to understand the diverse needs of each student in an intervention setting. An effective intervention is not “one size fits all.” Teachers need an efficient process to isolate the learning gaps preventing students from experiencing success in math, and once tasks are matched to the capability of each student, they need extensive opportunities for practice, along with constant feedback on their performance (VanDerHeyden, n.d.).
During intervention, as students are given time for math practice on individualized tasks at appropriate levels of difficulty (increased Academic Learning Time), they may be able to work through several objectives with success. But, undoubtedly, students will encounter objectives that present difficulties. This creates opportunities for the teacher to intervene with appropriate and targeted instruction, including instructional strategies specific to struggling students.

Teacher modeling of problem-solving strategies is an effective technique, particularly for populations struggling with mathematics. The process should include verbalization of the teacher’s thinking while solving a problem (Gersten, Beckmann, et al., 2009). Montague (2004) suggests that both correct and incorrect problem-solving behaviors be modeled:

Modeling of correct behaviors helps students understand how good problem solvers use the processes and strategies appropriately. Modeling of incorrect behaviors allows students to learn how to use self-regulation strategies to monitor their performance and locate and correct errors. When students learn the modeling routine, they then can exchange places with the teacher and become models for their peers. (p. 8)

In addition, “when teaching a new procedure or concept, teachers should begin by modeling and/or thinking aloud and working through several examples. While modeling the steps in the problem...the teacher should verbalize the procedures, note the symbols used and what they mean, and explain any decision-making and thinking processes (for example, ‘That is a plus sign. That means I should…’)” (Jayanthi, Gersten, & Baker, 2008, p. 5).

Similarly, student verbalization, or “think-aloud,” is an evidence-based approach that helps build student understanding while providing the teacher with an opportunity to diagnose misconceptions (Gersten, Beckmann, et al., 2009). The National Mathematics Advisory Panel (2008b) recommends that teachers, as part of explicit instruction, allow students to think aloud about decisions made while solving problems. “Verbalization may help to anchor skills and strategies both behaviorally and mathematically. Verbalizing steps in problem solving may address students’ impulsivity directly, thus suggesting that verbalization may facilitate students’ self-regulation during problem solving” (Jayanthi et al., 2008, p. 7). And student verbalization is beneficial for the teacher to pinpoint any areas of confusion or misunderstanding as part of a formative process to target additional instruction.

**Effective Strategies for Students Struggling With Mathematics**

- **Teacher modeling of problem-solving strategies**, using verbalization (Gersten, Beckmann, et al., 2009), or thinking aloud about procedures, symbols, and decision making (Jayanthi, Gersten, & Baker, 2008), including both correct and incorrect behaviors (Montague, 2004)

- **Student verbalization**, or think-alouds (NCTM, 2007), to help build understanding while providing the teacher with an opportunity to diagnose misconceptions (Gersten, Beckmann, et al., 2009)

**Differentiated student practice with feedback**

Practice is critical to a student solidifying knowledge of a skill, but experts say that it is important a student is taught and understands a skill before practicing it (Shellard, 2004). Depending on the skill and the student's level of competence, it may be more appropriate to develop a conceptual understanding before extensive practice. In some circumstances, experts say that concepts and procedures can be taught simultaneously, and practice with feedback will strengthen that knowledge. As the National Research Council (2001) notes,

Practice is important in the development of mathematical proficiency. When students have multiple opportunities to use computational procedures, reasoning processes, and problem-solving strategies they are learning, the methods they are using become smoother, more reliable, and better understood. Practice alone does not always suffice; it needs to be built on conceptual understanding and instruction on procedures and strategies. (p. 422)
Research shows not all types of student practice are equally effective. Practice is absolutely essential for building any skill, but research shows that to be effective, practice should embody certain characteristics, which parallel the characteristics of Academic Learning Time in general (see p. 3). It must be personalized and coupled with instruction, as mentioned previously.

Personalized practice means practice matched to student ability so students are challenged but not frustrated. There is a strong relationship between deliberate practice and the development of expertise in many domains including mathematical calculation (Butterworth, 2006).

It also means practice must be accountable. Teachers and students must receive frequent feedback, and teachers must intervene as necessary to assure students are successful at a high level (Coyle, 2009; Ericsson, Krampe, & Tesch-Römer, 1993). The National Research Council (2001) recommends that “practice should be used with feedback to support all strands of mathematical proficiency and not just procedural fluency. In particular, practice on computational procedures should be designed to build on and extend understanding” (p. 423).

According to Sadler (1989, p. 121), “Feedback is a key element in formative assessment,” but information “is considered as feedback only when it is used to alter the gap” between a student’s goal and actual performance. Differentiated student practice is facilitated by the teacher utilizing ongoing formative assessment information to help students answer three questions related to their learning (Atkin, Black, & Coffey, 2001): Where am I going? Where am I now? How can I close the gap between where I am now and where I am going? Formative assessment is an ongoing, dynamic process used to guide instruction and help determine the next steps in learning for each individual student (Chappuis & Chappuis, 2007/2008).

The feedback provided in a formative assessment process occurs while there is still time to take action. “Only by keeping a very close eye on emerging learning through formative assessment can teachers be prospective, determining what is within the students’ reach, and providing them experiences to support and extend learning” (Heritage, 2010, p. 8). “Consistent and ongoing feedback has been shown to be quite effective in improving student performance…In particular, the value of immediate feedback stands out. Regular feedback helps students guide and improve their own practice, even as giving feedback helps teachers guide and tailor their own instruction” (Steedly et al., 2008, p. 9; see also NCTM, 2007).

A meta-analysis shows that providing ongoing feedback using formative data about how each student was performing enhanced student math achievement (Gersten, Chard, et al., 2009). “The regular use of formative assessment data by teachers, especially if teachers have additional guidance on using the data to design and individualize instruction, has been shown to be an effective instructional practice” (National Mathematics Advisory Panel [NMAP], 2008b, p. xxiii).

**Putting the research into practice with Accelerated Math for Intervention**

Renaissance Learning’s trusted Accelerated Math software is the driving force behind Accelerated Math for Intervention. As described by the National Math Panel, Accelerated Math is a “mathematics program with assessment of skill level, tailoring of the instruction to match skill level, individual pacing and goal setting, ample practice, and immediate feedback to student and teacher on performance” (2008a, p. 160).

Accelerated Math meets five critical criteria identified by the Formative Assessment for Teachers and Students (FAST) State Collaborative on Assessment and Student Standards (SCASS) for effective formative assessment: “(1) learning progressions, (2) learning goals and criteria for success, (3) descriptive feedback, (4) self- and peer-assessment, and (5) collaboration” (McManus, 2008, pp. 4–5).
Within the Accelerated Math for Intervention framework, Accelerated Math’s diagnostic tools enable optimal differentiation, providing students with efficient practice of critical skills coupled with immediate feedback.

For more than 10 years, Accelerated Math has helped educators differentiate instruction and make time for dedicated student practice as well as helped students experience success and consequently get more enjoyment out of math. For example, in an Ysseldyke & Tardrew (2007) study, 2,202 students in grades 3–10 at 47 schools across 24 U.S. states gained 7 to 18 percentiles more than comparison students. In every grade and subgroup identified, such as eligibility for Title I and free or reduced-lunch programs, students in Accelerated Math classes performed better than students in classes not using the software (see Figure 3).

**Figure 3: Accelerated Math Achievement Gains by Subgroup**

Additionally, students who more closely followed Accelerated Math Best Practices by scoring greater than 85% correct and completing more objectives, gained even more than students who did not. Accelerated Math educators reported qualitative improvements in their classrooms as well—teachers spent more time providing individual instruction, students spent more time academically engaged, and students enjoyed math more and took responsibility for their work. In total, 80% of Accelerated Math educators stated that students were learning basic math skills better.

Accelerated Math facilitates formative assessment and differentiation within Accelerated Math for Intervention, in line with Heritage’s (2010) definition of a formative assessment process that provides “indications of students’ learning status relative to the ‘gap’ that teachers and students can use to make adjustments to learning while that learning is developing,” and “consistently working from students’ emerging understandings within the ZPD, supporting learning through the instructional scaffolding, including feedback, and the active involvement of students in the assessment/learning process” (p. 15).
In addition to being confirmed by several leading math experts (see box), the scope and sequence of the Accelerated Math learning objectives parallels recommendations found in the National Council of Teachers of Mathematics (NCTM) 2006 Curriculum Focal Points, the National Mathematics Advisory Panel 2008 final report, and the 2010 Common Core State Standards for Mathematics.

For Accelerated Math for Intervention, the power of Accelerated Math has been combined with MathFacts in a Flash and STAR Math, and supported by focused professional development on proven instructional strategies, to provide educators with a comprehensive intervention that includes everything they need to affect change in students struggling with mathematics.

To learn math, students must continually climb a staircase of learning progressions that leads to understanding. Critical skills and concepts that students miss become gaps in this foundational staircase that make progressing to the next step more difficult. The more steps that are missed, the more difficult it is to successfully move forward.

Accelerated Math for Intervention gives teachers several ways to identify the critical steps students have missed. This is important to note, as students needing intervention will likely have diverse needs. Likewise, instruction and student practice within Accelerated Math for Intervention is fully differentiated; each next step is triggered by student performance.

**Initial assessment**
Teachers using Accelerated Math for Intervention administer STAR Math, a reliable, valid, and efficient, computer-adaptive assessment of general math achievement, to gather baseline data for students and initially determine their placement for practice in the Accelerated Math libraries of objectives. STAR Math results will likely give teachers an idea about the grade-level set of math objectives a student probably already knows and in which area the student will likely need more instruction and practice. Since 2009, STAR Math has been highly rated as a screening tool by the National Center on Response to Intervention, most recently earning perfect scores in all categories in the 2011 review, meaning this assessment can support decisions regarding whether a particular student needs intervention. (Please see Appendix B, p. 29, for the STAR Math Screening Report or a sampling of key Accelerated Math for Intervention reports.)

**Determining the skills a student has and has not mastered**
Teachers may begin students’ work in Accelerated Math by having them take diagnostic tests on core math objectives—those that are gateway skills to advanced objectives—to confirm which objectives have been mastered and which need attention. Because each objective has been meticulously designed, validated, and sequenced into learning progressions, after determining the skills a student in an Accelerated Math for Intervention classroom is struggling with, educators are able to easily determine the prerequisite skills that student needs to master by reviewing the Accelerated Math Learning Progressions for Instructional Planning document (Renaissance Learning, 2009a). Figure 4 illustrates the prerequisite objectives for a sample fifth-grade objective.
Based on the results of the diagnostic test, students begin individualized student practice and practice/test cycles through mastery and review of each needed objective. When students need help, the teacher and student confer to diagnose errors and use modeling, student verbalization, or think-alouds, and other strategies to address individual needs.

**Identifying need for math fact fluency**

Because students struggling with mathematics are frequently lacking math facts fluency, teachers using Accelerated Math for Intervention also have students begin working with Renaissance Learning’s proven Mathfacts in a Flash software to identify the key math facts they know with automaticity and those they need to work on. Placement is based on grade-level benchmarks for fact fluency, but teachers may use Mathfacts in a Flash review tests to help with initial placement if necessary. Teachers never assign fact fluency practice on operations and facts that have not yet been taught.

**Practice, practice, instruction, and more practice!**

One characteristic shared by nearly all students struggling with math—and this is likely true of most students in the country—is that they have not devoted enough time to practicing core math skills along with feedback (i.e. Academic Learning Time, or ALT) to truly become proficient. Effective, personalized practice requires continuous daily—even hourly—instruction,

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**Prerequisite objectives include concepts, terminology, and skills that are essential for mastering later objectives. Accelerated Math for Intervention helps teachers quickly identify the gaps in each student’s knowledge that are preventing mastery of grade-level material.**

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Accelerated Math for Intervention increases Academic Learning Time (ALT), an important component of most school improvement models, including Response to Intervention, the turnaround and transformational models of the federal Race to the Top and School Improvement Grant programs, among others.
practice, and assessment within a formative assessment process. The most salient characteristic of Accelerated Math for Intervention is that students needing intervention must be provided with sufficient time to practice mathematics problems at their individual levels. Once critical skills gaps are identified using the program assessment components, students will spend an extensive amount of time practicing—with immediate feedback from the software, and instructional guidance from the teacher as necessary. The fact is that this kind of hard, dedicated work is the only way for students who are significantly working below grade level to become proficient. The good news is that this kind of differentiated instruction and practice has been shown to produce remarkable gains in achievement.

Research on Accelerated Math shows that overall student mathematics achievement improves significantly if sufficient time is spent practicing mathematics at the appropriate level of challenge (Ysseldyke & Bolt, 2007; Ysseycke & Tardrew, 2007). Ensuring that students are practicing solving mathematics problems at their individual levels—so students can and do understand the reasoning and processes used—is a fundamental principle underlying Accelerated Math for Intervention. Like any other skill, Academic Learning Time is vital: Time must be spent actually practicing mathematics in order to improve.

**Why is differentiated instruction & practice necessary?**

Intervention classrooms tend to be quite diverse in terms of mastery and achievement levels of the students. Some may have mixed grades in the same class and most certainly have significant variance in terms of achievement. The students in a given class usually do not need the same thing, or at the same time, so one-size-fits-all, whole-group instruction will generally not be an effective technique. Recall the definition of ALT on p. 3: Proper level for individual success is just as important as total minutes on task, as is personalized feedback. Accelerated Math for Intervention gives teachers a toolbox to re-teach concepts that students have struggled with in the past as well as the tools needed to identify weak areas and target appropriate instruction to specific students.

**How can you provide all this differentiated attention without burdening the teacher?**

The Accelerated Math software puts technology to use to do what it does best, enable efficient classroom management with individualized student practice, automatic scoring, immediate feedback for both student and teacher, and comprehensive tracking of student data. With these management tasks out of the way, intervention instruction revolves around student-to-teacher interaction, which research shows is most effective.

(Accelerated Math for Intervention provides strategic use of technology for differentiated student practice and to support—not replace—teacher-led instruction. This program revolves around **student-to-teacher interaction**, which research shows is most effective. (Kroesbergen & Van Luit, 2003)

Rich data from Accelerated Math enhances student-to-teacher interaction by helping the teacher use both strategic groups and independent, targeted one-to-one attention in the most effective manner possible. The strategic use of computers to enhance teacher-centric strategies in an intervention setting is supported by research (Kroesbergen & Van Luit, 2003):
Computer-aided instruction (CAI) can be very helpful when students have to be motivated to practice with certain kinds of problems. With the use of a computer, it is possible to let children practice and automatize math facts and also to provide direct feedback. However, the computer cannot remediate the basic difficulties that the children encounter. The results show that in general, traditional interventions with humans as teachers, and not computers, are most effective. (p. 112)

**Effective instructional strategies**
Accelerated Math for Intervention provides teachers with the training and tools to implement a formative assessment process within their intervention framework. Focused professional development includes classroom management and monitoring techniques as well as instructional strategies proven to work for students struggling with mathematics. Data from Accelerated Math facilitates using formative feedback for activities including progress-monitoring; goal setting; strategic grouping; problem-solving strategies, such as verbalization and modeling; schema-based instruction; and corrective feedback. Also included in the intervention package are number sense activities—a common skill gap for students struggling with math—that may be conducted with small-groups of students or as peer-to-peer interactions (NCTM, 2007), which are found in the *Numeracy Development and Intervention Guide* and the *Fractions, Decimals, and Percents Development and Intervention Guide*, both by Dr. Kenneth E. Vos.

With Accelerated Math for Intervention, teachers and students have regular, purposeful interactions—short conferences focused on the student’s current work and feedback. These two-way interactions incorporate both teacher modeling and student verbalization, or think-aloud, techniques. The teacher models strategies and mathematical thinking for the student, including using visual aids such as Worked Examples (see Figure 5), and students verbalize their decision-making processes and explain how they arrived at the solution to a math problem. Each strategy and technique built into Accelerated Math for Intervention allows for the differentiated practice and targeted instruction required for students struggling with mathematics.
Critical Math Skills Mastery

Accelerated Math for Intervention is focused on student mastery of critical mathematics skills—the core math objectives, concepts, and procedures as well as math facts automatically—that students who struggle with mathematics have never mastered sufficiently to be able to tackle more complex concepts and procedures.

What the research says

Computation and problem-solving mastery

As mentioned previously, the knowledge gaps that students struggling with mathematics have may be characterized as deficiencies in conceptual or procedural understanding, strategic competence, adaptive reasoning, or a student's disposition toward math—and most likely are a combination of these five strands. “Providing a mix of direct instruction of new skills and concepts, guided practice, opportunities for complex thinking and problem solving, and time for discussion is even more important for the struggling student than for students in general” (Shellard, 2004, p. 41).

A meta-analysis of research summarized in the Institute of Education Sciences (IES) Practice Guide for Assisting Students Struggling with Mathematics recommends that a math intervention should include both foundational concepts and skills introduced earlier in the student's career but not fully understood and mastered as well as systematic, explicit instruction (Gersten, Beckmann, et al., 2009).

The National Mathematics Advisory Panel (2008b) found that providing “explicit instruction with students who have mathematical difficulties has shown consistently positive effects on performance with word problems and computation…. This finding does not mean that all of a student's mathematics instruction should be delivered in an explicit fashion. However, the Panel recommends that struggling students receive some explicit mathematics instruction regularly. Some of this time should be dedicated to ensuring that these students possess the foundational skills and conceptual knowledge necessary for understanding the mathematics they are learning at their grade level” (p. xxiii).

Providing teachers with precise information on student progress and specific areas of strengths and weaknesses in mathematics is an effective practice. “Before mastery instruction or techniques are used, it is essential that the student possess the preskills and understand the concept related to the targeted skill” (Mercer & Miller, 1992, p. 22). Using effective strategies, teachers can help to close skills gaps by having each student work on what they know and build upon that foundation.

Math facts mastery

A common critical skill students struggling with mathematics lack is math facts knowledge and automaticity. "Automaticity refers to the phenomenon that a skill can be performed with minimal awareness of its use” (Hartnedy, Mozzoni, & Fahoum, 2005; Howell & Lorson-Howell, 1990). While practicing single-digit calculations is essential for developing fluency (National Research Council, 2001), it is widely recognized that, “Few curricula in the United States provide sufficient practice to ensure fast and efficient solving of basic fact combinations and execution of the standard algorithms” (NMAP, 2008b, p. 27).

Upon entering sixth grade, fewer than a third of students have demonstrated mastery of multiplication facts, and fewer than a fifth have demonstrated mastery of division.

Upon entering sixth grade, fewer than a third of students have demonstrated mastery of multiplication facts, and fewer than a fifth have demonstrated mastery of division. And since there is little if any focus on these facts after fifth grade, it is a safe assumption that many never master them at all (Baroody, 1985; Isaacs & Carroll, 1999).
This is not to say that most students do not know how to add, subtract, multiply, and divide. Clearly they do, or they would not score even as well as they do on benchmark assessments. But they have not achieved mastery—or more strictly speaking, they have not achieved automaticity, the essential foundation of computational fluency. Their knowledge of these core operations, which undergird all of mathematics, is “procedural” rather than “declarative.” That is, students know how to multiply 8 x 7, but they do not know that 8 x 7 is 56, so they must calculate or use strategies that take time and mental resources away from higher-level operations (Ashlock, 2009).

There is a growing consensus that automatic recall of math facts—addition, subtraction, multiplication, and division—is an indispensable element in building computational fluency, preparing students for math success, both present and future (Battista, 1999). Just as phonemic awareness and decoding are the crucial elements in learning to read, automaticity and conceptual understanding go hand in hand in mathematics development (Gersten & Chard, 1999). Failure to develop automatic retrieval, on the other hand, leads to mathematical difficulties (Bryant, Bryant, Gersten, Scammacca, & Chavez, 2008).

It is not enough that students simply “learn” their number facts—they must be committed to memory, just as letter sounds must be memorized in development of phonics automaticity (Willingham, 2009). Automaticity is a different type of knowledge; it is “based on memory retrieval, whereas nonautomatic performance is based on an algorithm” (Logan, 1988, p. 494). Learning starts with understanding of concepts, to be sure, but memory skills must develop simultaneously. “Children need both procedural knowledge about how to do things and declarative knowledge of facts” (Pellegrino & Goldman, 1987, p. 31). Declarative memory (which recalls that things are so) not only speeds up the basic arithmetic operations themselves (Garnett & Flesch, 1983); it also acts to “free up working memory capacity that then becomes available to address more difficult mathematical tasks” (Pegg, Graham, & Bellert, 2005, p. 50; see also Gersten, Jordan, & Flojo, 2005; Sousa, 2006). This automatic retrieval of basic math facts is critical to solving complex problems that have simpler problems embedded in them (Willingham, 2009–10). The National Mathematics Advisory Panel final report in 2008 put it this way:

To prepare students for Algebra, the curriculum must simultaneously develop conceptual understanding, computational fluency, and problem-solving skills … Computational proficiency with whole number operations is dependent on sufficient and appropriate practice to develop automatic recall of addition and related subtraction facts, and of multiplication and related division facts. (p. xix)

The key to automaticity is practice, and lots of it (Willingham, 2009). To move a fact (or skill) from short-term to long-term memory requires “overlearning”—not just getting an item right, but getting it right repeatedly (Willingham, 2004). And retaining the memory for a long interval requires spacing out additional practice after initial mastery—emphasizing the importance of regular review of learned material (Rohrer, Taylor, Pashler, Wixted, & Cepeda, 2005). Brain research indicates that repetitions actually produce changes in the brain, thickening the neurons’ myelin sheath and creating more “bandwidth” for faster retrieval (Hill & Schneider, 2006; see also Coyle, 2009).

For all of these reasons, the federal Institute of Education Sciences (IES) recommends math facts fluency intervention for students at all grade levels in Response to Intervention (RTI) schools. The IES Practice Guide (Gersten, Beckmann, et al., 2009) states:

Quick retrieval of basic arithmetic facts is critical for success in mathematics. Yet research has found that many students with difficulties in mathematics are not fluent in such facts…. We recommend that about 10 minutes be devoted to building this proficiency during each intervention session. (p. 37)
“Because progress in math builds heavily upon previously learned skills, it is important for instruction to be clear, unambiguous, and systematic, with key prerequisite skills taught in advance. For instance, children should not be expected to develop automatic recall of addition facts if they do not understand the basic concept of addition or the meaning of the addition sign” (Spear-Swerling, 2005, p. 1).

Traditional methods of math facts practice—such as flash cards—are not bad in themselves, but they are insufficient. They require far too much paperwork and teacher time to administer the necessary number of items at the desired frequency to produce mastery. Such methods also do not keep track of which facts have been mastered and should be reinforced over time, and which new facts to introduce next, so that the student can move through the full sequence on a timely basis. For this reason, properly designed software tools are recommended by the National Mathematics Advisory Panel (2008b).

**Putting the research into practice with Accelerated Math for Intervention**

**Supporting mastery with appropriate tools**

Accelerated Math for Intervention supports explicit, targeted instruction on and dedicated student practice of critical math skills, so that students struggling with mathematics are able to fill any gaps in prerequisite knowledge that are impeding their grade-level success. The intervention is focused on math fact automaticity and core math skills, based on a logical progression through mastery of math skills.

Because automaticity of basic addition, subtraction, multiplication, and division facts enables fast and accurate computation as well as efficient problem solving, it is fundamental to improving math achievement. Accelerated Math for Intervention was designed based on automaticity research. The professional development materials include guidance for teachers on building students’ math fact fluency, including devoting 10 minutes of each class period to deliberate, measurable practice with MathFacts in a Flash. Research shows MathFacts in a Flash can help to double math gains for students who use the program regularly (Burns, Kanive, & Degrande, in press).

If a student is lacking the prerequisite early-number skills needed to even begin working on math fact automaticity, teachers can refer to the *Numeracy Development and Intervention Guide*, by Dr. Kenneth E. Vos, also included with the program. Likewise, to help teachers develop students’ conceptual understanding of fractions—a number sense skill of particular importance for algebra readiness—Accelerated Math for Intervention also includes the *Fractions, Decimals, and Percents Development and Intervention Guide* (also by Dr. Vos).

To help students develop core math skills, the Accelerated Math software provides differentiated practice on math objectives until mastery is achieved, including review of mastered objectives to ensure retention. Accelerated Math objectives focus mostly on concepts (e.g., questions aimed at understanding what a fraction is) and procedures (e.g., how to add multi-digit numbers) but also include multistep word problems that require use of both basic problem-solving strategies and conceptual/procedural knowledge.

Data from MathFacts in a Flash and Accelerated Math helps the teacher identify core objectives, learning progressions, and prerequisite skills for each student based on the skills a student has and has not mastered, ensuring that teachers are able to target instruction specific to individual student needs. This information is also beneficial to determine if students can be grouped for instructional support on a specific skill, or if a
particular student requires additional individual attention. Instructional tools help teachers prioritize and prepare instruction on skills as well as provide additional information such as key concepts (terminology), sample practice items, worked examples, and a math glossary. And with the *Accelerated Math Learning Progressions for Instructional Planning* document (Renaissance Learning, 2009a), teachers are able to visually assess where objectives sit within learning progressions that span grade levels, enhancing their ability to ensure mastery of critical skills.

**Support mastery through consistent routines**

A core routine for the Accelerated Math for Intervention program involves teacher-student conferences. These short, purposeful meetings are guided by professional development and help teachers provide feedback as well as probe into students’ thought processes and diagnose misconceptions as they arise. Students complete Accelerated Math assignments and tests on paper before submitting their answers for scoring via handheld responder or scanner, which provides the teacher with a window into a student’s thinking and problem-solving patterns. The teacher can use students’ worked problems as a jumping-off point for utilizing verbalization, or think-aloud, strategies, by asking students to talk about the steps they took to solve a problem.

To help students develop core math skills, the Accelerated Math software provides differentiated practice on math objectives until mastery is achieved, including review of mastered objectives to ensure retention.
Motivation and Engagement

Students struggling with mathematics are often lacking in motivation and engagement, stemming from their belief that they “just can’t do math” and a continued struggle with coursework that seems to get increasingly more difficult. Because these students are missing critical foundational skills, they fall further and further behind as the class continues to move on to each subsequent topic. Teachers can motivate students to strive for mathematical proficiency by supporting their expectations for achieving success through effort and by helping students appreciate the value of what they are learning.

What the research says

Many students who experience difficulty in math develop negative attitudes toward the subject matter, which makes it increasingly important to utilize strategies that encourage positive attitudes, such as involving students in setting challenging but attainable goals, ensuring instruction builds on previously learned skills, and modeling an enthusiastic and positive attitude about math (Mercer & Miller, 1992). According to the National Research Council (2001), “students need continued confidence that they can meet the challenges of school mathematics” (p. 339). Helping students achieve self-efficacy can be done through two basic strategies: assign tasks students can successfully complete with reasonable effort, and provide necessary scaffolding to support students as they work to attain and put to use concepts, skills, and abilities.

Student academic engagement is correlated with improved academic achievement (Batsche, 2007; Berliner, 1991; Gettinger & Stoiber, 1999; Karweit, 1982). Frederick (1977) found that high-achieving students in secondary classrooms were academically engaged 75% of the time, compared to 51% for low-achieving students. Thus, it is vital to engage students that are struggling with mathematics in order to improve their mathematics proficiency. Students will become engaged as they begin to experience success, see the value of mathematics, and recognize that effort matters; any math intervention needs to include strategies to address these needs. The National Mathematics Advisory Panel (2008b) found,

Experimental studies have demonstrated that children’s beliefs about the relative importance of effort and ability or inherent talent can be changed, and that increased emphasis on the importance of effort is related to greater engagement in mathematics learning and, through this engagement, improved mathematics grades and achievement. Research demonstrating that beliefs about effort matter and that these beliefs can be changed is critical. Much of the public’s resignation about mathematics education (together with the common tendencies to dismiss weak achievement and to give up early) seems rooted in the idea that success in mathematics is largely a matter of inherent talent, not effort. (p. 31)

In order to improve students’ motivation, the IES Practice Guide (Gersten, Beckmann, et al., 2009) recommends teachers “reinforce or praise students for their effort and for attending to and being engaged in the lesson” (p. 12). A student’s ability to self monitor by graphing or charting their own progress and setting their own goals can also have potentially positive effects. “The panel believes that praise should be immediate and specific to highlight student effort and engagement....Praise is most effective when it points to specific progress that students are making” (p. 45).

Putting the research into practice with Accelerated Math for Intervention

Providing opportunities for success

High levels of success are not only vital to improving math achievement but also critical for motivation. Success motivates. Continual failure de-motivates and frustrates. This is why student practice in Accelerated Math for Intervention is aligned to each student’s zone of proximal development (ZPD), the difficulty level that
is neither too difficult and thus frustrating nor so easy that no new knowledge and skills are learned. Data from the program ensures teachers understand both what students know and what they need to learn, so they are able to build on students’ current knowledge. Practicing math in individualized ZPDs set students up for success and, in turn, motivates more practice.

The key to successful student practice in Accelerated Math for Intervention is for the students to see that they are, in fact, successful. The intervention components lend themselves well to ensuring students receive frequent, immediate feedback. Students receive immediate feedback in the form of informative reports upon submitting Accelerated Math assignments (which students first complete on paper and then submit for scoring either via handheld responder or scanner). In MathFacts in a Flash, student progress is displayed on screen and in reports for work completed. It is often motivating for students to attempt to beat previous response rates as facts become automatically retrieved from memory, and this, in turn, encourages automatic retrieval of facts as well as improved attitudes about math.

Accelerated Math for Intervention incorporates social interaction for students struggling with mathematics. Teachers may group students struggling with similar skills for targeted instruction or other activities (see Figure 6). In these small groups, students can discuss problem-solving strategies and share ideas.

**Figure 6: Example Accelerated Math for Intervention Classroom**

- **Differentiated instruction** ensures success for every student. The teacher monitors each student’s progress and provides instruction as needed.
- **Personalized practice assignments** keep students motivated and challenged.
- **Number sense activities** help students attain missing prerequisite math skills.
- **Math Fact Fluency and Assessment** leads to automaticity for fast and accurate computation and problem solving.
Parental involvement—connecting school to home—is a very motivating social factor for students. Accelerated Math for Intervention establishes open communication with the Renaissance Home Connect website, which parents can access to view details of their child’s completed math work, and students can use for additional math practice at home (see Figure 7). Renaissance Home Connect also allows students to have results sent via email to parents and other caregivers upon completion of an Accelerated Math test or MathFacts in a Flash level.

**Figure 7: Example Renaissance Home Connect Screen**

In the Accelerated Math for Intervention classroom, teachers build in a range of motivators. What works for different classrooms and ages varies, but the professional development that supports the intervention includes examples of what actual teachers have found to be successful, tied to measurable effort on student practice, tests, or individual goals. For example, professional development recommendations for Accelerated Math for Intervention suggest teachers capitalize on immediate feedback—which is essential in a formative assessment process—by having students check in with the teacher upon its receipt for additional quick, efficient, and genuine personal feedback that includes congratulations, encouragement, and additional instruction as needed. Training materials also emphasize that effort, not only success, should be highly and frequently praised by teachers.

Accelerated Math for Intervention routines, which teachers learn through focused professional development training, emphasize that students taking part in the intervention always remain engaged in an activity (be it completing Accelerated Math assignments, practicing math facts fluency with MathFacts in a Flash, referencing classroom resources to aid problem solving—such as Worked Examples provided as part of the intervention—and so forth). When students complete an activity, they should know what the teacher expects them to work on next. These routines develop and promote students self-efficacy, which is tied to increased motivation and improved attitudes towards math.

In 2001, students were asked to respond to attitudinal surveys at the beginning and end of an Accelerated Math study (Gaeddert). At the end of the study, students using Accelerated Math showed greater improvement in their attitudes toward math than students in the control classes. And surveys of parents with children in the intervention classes also indicated more positive attitudes toward math than parents of the children in the control classes. Likewise, in a 2005 study, almost 60% of the students responding to a survey indicated that they liked math better after using MathFacts in a Flash (Ysseldyke, Thill, Pohl, & Bolt).
**Student-centered goal setting**

The STAR Math component of Accelerated Math for Intervention includes the ability for teachers to set individual goals for each student and then monitor students’ progress towards these goals. Teachers can include students in the goal-setting process and then use a report generated by the assessment, presented in a user-friendly, graphical display, to share student progress both with students and parents. Seeing a visual representation of growth, like the Student Progress Monitoring Report, can be very motivational for students that may be experiencing success in mathematics for the very first time (see Figure 8).

Additionally, Accelerated Math for Intervention routines include having students chart their own progress. Teacher materials include reproducible charts specifically for this purpose. Research on Accelerated Math has found students’ attitudes about math become more positive as they see personal success (Cosenza, 2004; Ysseldyke et al., 2007).

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2 For a full-sized example of this report, or a look at a sampling of key Accelerated Math for Intervention reports, see Appendix B, p. 29. The complete menu of reports available for the Accelerated Math for Intervention software components is found in a separate publication from Renaissance Learning, *Key Report Samples*, available online from http://doc.renlearn.com/KMN/ET/R03S63226GE7E60.pdf.
Informative Assessment

The Accelerated Math for Intervention components—Accelerated Math, MathFacts in a Flash, and STAR Math—are all reliable, valid, and efficient measures that provide actionable data about student achievement in mathematics for screening, progress monitoring, skills diagnosis, and formative assessment.

What the research says

Assessment is a critical component of intervention. Data from assessments is used both to identify students’ knowledge gaps in critical skills mastery and to regularly monitor the progress of students receiving an intervention. The National Council of Teachers of Mathematics (2000) recommends that assessment “be an integral part of instruction that informs and guides teachers as they make instructional decisions” (p. 22) and that teachers use a variety of assessment methods, including formative techniques that guide instruction and summative methods that measure progress. “Assessment...involves both teacher and students in reciprocal activity to move learning forward within a community of practice” (Heritage, 2010, p. 8).

The IES Practice Guide (Gersten, Beckmann, et al., 2009) recommends screening students to identify those at risk for potential mathematics difficulties, monitoring the progress of students receiving supplemental instruction at least once a month, and using curriculum-embedded assessments to determine whether students are learning from the intervention as often as daily or as infrequently as every other week. The Guide advises that a complete intervention needs to incorporate all three types of assessment to ensure these purposes are met.

After students are identified for intervention, formative assessment is used frequently in an intervention setting to monitor student progress toward proficiency and inform targeted instruction and differentiated practice. Research indicates the importance of two general approaches to formative evaluation (Fuchs & Deno, 1991; Gersten, Chard, et al., 2009), which provide different, but equally vital, types of information:

- Mastery measures, sometimes thought of as curriculum-embedded assessments, meant to gauge how well students have learned material in a daily lesson or have mastered a specific skill or subskill
- General outcome measures, or broader measures of mathematics proficiency, meant to provide the school with a sense of how the overall mathematics program is affecting a student

Mastery measurement, in particular, is an instructional process with extensive research support as being effective for all students. Because mastery measures are focused on specific skills, they are well suited for diagnostic evaluation, meaning teachers can pinpoint areas needing attention (Burns, 2010). Benjamin Bloom’s (1980) “mastery learning” experiments demonstrated that using formative assessments as a basis to modify curriculum and instruction improved average student performance dramatically—in effect, shifting the entire achievement distribution curve in a positive direction. Black and William’s 1998 meta-analysis further documented how using assessment results to set goals and determine whether interventions improve performance is particularly effective in reducing achievement gaps between subgroups. Other researchers have demonstrated that lower achieving students were less likely to require special-education referrals, or remained in special education less time, when these techniques were applied system wide (Bollman, Silberglitt, & Gibbons, 2007; Marston, Muyskens, Lau, & Canter, 2003).

All components of Accelerated Math for Intervention—Accelerated Math, MathFacts in a Flash, and STAR Math—are highly rated by NCRTI experts.
Putting the research into practice with Accelerated Math for Intervention

Efficiently generating necessary achievement data is of primary importance within an intervention setting. Teachers rely on up-to-date information for each student to ensure that all students are receiving the necessary help to make them successful. Accelerated Math for Intervention provides a complete, cohesive assessment package that includes screening, progress monitoring, and formative evaluation of mastery of skills as well as general outcome, diagnostic, and automaticity measurement.


Screening and progress monitoring

STAR Math is the first step in the Accelerated Math for Intervention program. It provides teachers with actionable data for screening as well as initial placement in and progress monitoring the efficacy of the intervention (see Figure 9). STAR Math is accurate, valid, reliable, efficient, and repeatable, as research indicates is essential (Johnson, Mellard, Fuchs, & McKnight, 2006; Mellard & Johnson, 2008; Tilly, 2007).

The computer-adaptive STAR Math assessment is easy to use and saves teachers significant time over administering paper and pencil tests, and it provides much more information. Test administration time for STAR Math is only about 15 minutes, and students quickly learn to take the test with minimal monitoring by the teacher. Computer adaptive means that the software adapts to the student’s responses while the student is taking the test, so each administration is neither too difficult nor too easy.

Within the intervention setting, STAR Math is even more powerful by providing a way to monitor growth for each student receiving intervention. Teachers can easily set performance goals and assess students periodically to determine if their growth is progressing at a sufficient rate. Research consistently demonstrates using progress monitoring techniques to collect, analyze, and make decisions on student performance data is associated with greater gains in student achievement (Jimerson, Burns, & VanDerHeyden, 2007).

STAR Math includes a Goal-Setting Wizard that provides teachers with a scientific method of goal setting using growth norms modeling. STAR Math data also supports teacher decisions about whether students are ready to exit the intervention or whether instructional changes are necessary.

Additionally, the STAR Math assessment guides the teacher by suggesting the appropriate Accelerated Math content library to have students begin working in based on their current performance. A key analytic benefit of STAR Math is the ability to compare growth between students to guide instructional decisions. For example, if the majority of students are not showing growth in STAR Math, the teacher should make sure the intervention is being implemented with fidelity. On the other hand, if most students are showing growth it can be assumed that the intervention is working overall. Data from STAR Math will then help the teacher identify any students not making progress and provide guidance about what is stalling success. This is much more useful to inform...
and adapt instruction and student practice than waiting for mid-year or end-of-year scores to see how progress is developing when it is too late to make changes that could impact a student's growth.

Formative assessment and monitoring of students' skills mastery
Daily progress-monitoring assessments are ideal within a formative assessment process because they inform instruction, provide immediate performance feedback, help monitor progress, and increase student motivation. Accelerated Math for Intervention facilitates formative assessment defined as “a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students’ achievement of intended instructional outcomes” (McManus, 2008, p. 3). The intervention incorporates the formative evaluation measurement tools necessary to monitor students’ mastery of skills and progress towards overall mathematics proficiency. As a result, teachers have the ability to measure students’ retention of skills, individual growth, and growth in comparison to peers.

Accelerated Math and MathFacts in a Flash provide immediate formative feedback for teachers using Accelerated Math for Intervention. The programs suggest next steps for the teacher and students on a daily basis; having a fully differentiated classroom—both in instruction and student practice—would be impossible without this kind of daily, formative assessment.

With the Accelerated Math and MathFacts in a Flash software, Accelerated Math for Intervention incorporates the first progress-monitoring mastery measurement systems to meet federal standards of quality set by the National Center on Response to Intervention. As mentioned previously, mastery measurement, a type of formative assessment, is a long-standing educational practice with a strong basis of research supporting its effectiveness. Accelerated Math and MathFacts in a Flash, as mastery measurement systems, do two things effectively: (1) provide students with an opportunity to practice math at individualized levels and receive immediate feedback, and (2) provide teachers with timely information on student mastery that can help them make the targeted instructional decisions.

In Accelerated Math for Intervention classrooms, students work on a hierarchical series of objectives and must demonstrate mastery of each objective before proceeding to the next one. Teachers can use data from Accelerated Math for diagnostic evaluation of the math objectives students may be struggling with and then adapt instruction as necessary. Accelerated Math for Intervention allows for a fully differentiated classroom because it identifies the specific skills each student is lacking mastery of that are ultimately preventing them from grade-level success. Essentially, the program helps teachers find the boundaries of each student’s knowledge and locate where opportunities lie to build upon that knowledge.

Teachers using Accelerated Math for Intervention know, specifically, which prerequisite skills to assign each student for more practice time, and which students need targeted instruction on those same skills. And built-in, frequent formative assessment continuously monitors students’ work to ensure that mastery of these skills is attained. Retention of skills is assured through built-in review of previously mastered objectives on practice assignments.

Accelerated Math for Intervention suggests next steps for the teacher and students on a daily basis; having a fully differentiated classroom—both in instruction and student practice—would be impossible without this kind of daily, formative assessment.

Achievement of foundational math facts automaticity is also monitored in Accelerated Math for Intervention. MathFacts in a Flash tracks the speed and accuracy of each student working towards math facts fluency, allowing for close monitoring of learned facts and the ability to set increasingly challenging time goals as automaticity progresses. Educators also have the ability to measure progress against local benchmarks.
Appendix A: Overview of Accelerated Math, MathFacts in a Flash, and STAR Math

**Accelerated Math**

Accelerated Math software personalizes student math practice and helps teachers generate assignments/tests, monitor progress, and motivate students to succeed. Teachers use progress-monitoring information provided by Accelerated Math to do what they do best—provide individualized, differentiated instruction to each student.

**Content development**

The Accelerated Math libraries were first published in 1998, with a scope and sequence based on commonalities between the 1989 National Council of Teachers of Mathematics (NCTM) standards, leading publisher textbooks, National Assessment of Educational Progress editions, and math editor teaching experience from the 1990s.

A great deal has occurred in U.S. education since 1998, and much professional thought has gone into what is important in mathematics. For the 2008 Accelerated Math content revision, Renaissance Learning (2009b) took into account all of the landmark changes and created a new scope and sequence for the Accelerated Math Second-Edition Libraries for Grades 1 through 8, Algebra 1, and Geometry that incorporated

- National Mathematics Advisory Panel (2008b) essential concepts and skills, and other recommendations
- Math curricular profiles of Singapore and other top-performing countries
- Alignments with model state standards
- Content reviews by the Northwest Regional Educational Laboratory, mathematics educators, mathematicians, and university researchers
- Research on effective development of algorithm-generated dynamic items

Then, in 2009, after the prerelease of the Committee on Early Childhood Mathematics and National Research Council’s report, *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity*, it became clear there was a resounding call for greater emphasis on early numeracy in mathematics. The NCTM Curriculum Focal Points had already identified foundational prekindergarten and kindergarten skills, and Renaissance Learning developed the Accelerated Math Early Numeracy Library with objectives to meet the needs of early or struggling math learners.

**How Accelerated Math works**

Accelerated Math assignments are individually generated and printed for each student. After students work math assignments on paper, they record and submit their responses using a scan card and AccelScan scanner, a hand-held Renaissance Responder, or a portable NEO 2 laptop. The software automatically scores each assignment and shares immediate feedback via informative reports for teacher and student.

Students follow various pathways for mastering objectives while using Accelerated Math (see Figure A1, next page), with the teacher monitoring progress regularly and providing instruction as needed. Upon completion of an assignment, the student continues on a path based on whether he or she was successful or not. If a student continues to be unsuccessful, the teacher receives a notification to intervene (both on reports4 printed from the program and in the software’s assignment book), and following teacher intervention, the student must attempt to master the objective again by practicing and testing. Once an objective is practiced, tested, and mastered, it is reviewed on practice assignments after two weeks. If the student is unsuccessful upon review, the objective status changes to intervene and the student repeats the practice, test, and review cycle.

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4 For a sampling of key Accelerated Math for Intervention reports, see Appendix B, p. 29.
Figure A1: Accelerated Math Cycle Overview

To help teachers identify students’ skill gaps, work in Accelerated Math for Intervention begins with diagnostic testing. This allows students to demonstrate mastery of known objectives, and allows the software to place objectives that are not mastered or known in the Ready to Work state for additional practice after instruction. Teachers assign additional objectives for practice as necessary.
There are four types of assignments in Accelerated Math:

- **Practice assignments** consist of multiple-choice questions, include teacher-assigned and Ready to Work objectives, and are designed to give students an opportunity to practice math concepts that have been previously taught.

- **Exercise assignments** consist of multiple-choice or free-response questions, include any objective specified by the teacher, and are designed to be used to supplement daily lessons or to provide more practice on specific objectives after a lesson or intervention.

- **Tests** consist of multiple-choice or free-response questions, include Ready to Test objectives, and are designed to allow students to demonstrate mastery of an objective.

- **Diagnostic tests** consist of multiple-choice or free-response questions, include any objectives specified by the teacher, and are designed to test students on any objective, even those not recently practiced. Teachers can use a diagnostic test to place incoming students or to allow students to master objectives directly when they have previous knowledge of certain objectives.

### MathFacts in a Flash

MathFacts in a Flash provides students at all levels with essential personalized practice of addition, subtraction, multiplication, and division facts, as well as other math skills, including squares and conversions between fractions, decimals, and percentages. Timed tests at appropriate skill levels accurately measure students’ practice and mastery, with feedback provided both onscreen and via a variety of detailed reports. Feedback motivates students and helps teachers inform instruction and monitor student progress towards benchmarks throughout the year.

There are five basic steps to implementing MathFacts in a Flash:

1. **Baseline test.** Students complete a 40-item timed test at the computer for each new math level. Immediate onscreen feedback provides time and accuracy data and shows any missed facts. If a student answers all 40 items correctly within the time limit, he or she moves on to the next math level. This allows all students to work at their own level of challenge.

2. **Personalized practice.** Math facts not mastered on the baseline test are presented to the student in practice sessions (see example, Figure A2). These are intermixed with mastered facts that are typically difficult for students at each level and other known facts, for a minimum of 20 items per practice session. Time allotted per day ranges between 5 and 15 minutes, with a recommended frequency of at least three times per week. Research shows frequent use of MathFacts in a Flash can help students to double math gains (Burns, Kanive, & Degrande, in press).

3. **Timed test for mastery.** Once students have successfully completed the practice sessions at a level, they complete a 40-item timed test for that level. Students master a level in MathFacts in a Flash when they are able to complete a test within the time goal with 100% accuracy.

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5 *Ready to Work* objectives are those that students have encountered on at least one practice or exercise assignment or diagnostic test without mastering.

6 *Ready to Test* objectives are those for which the student has successfully practiced, so he or she is ready to test for mastery on these objectives.
4. **Instant feedback.** Immediate onscreen feedback after each completed MathFacts in a Flash practice or test provides students with results on accuracy and time goals, allowing them to monitor their own progress. Additional corrective feedback is provided after each question answered incorrectly.

5. **Automatic advancement.** After students master their current level, the software automatically assigns the next math level. The sequence of math levels can be reordered to fit any curriculum.

**STAR Math**

The STAR Math assessment—used for screening, progress-monitoring, and diagnostic assessment—is a reliable, valid, and efficient, computer-adaptive assessment of general math achievement for grades 1–12. STAR Math reports nationally norm-referenced math scores and criterion-referenced evaluations of skill levels and provides these results via a variety of informative, easy-to-understand reports. A STAR Math assessment can be completed without teacher assistance in less than 15 minutes and repeated as often as weekly for progress monitoring. As part of the Accelerated Math for Intervention program, Renaissance Learning recommends monitoring students’ progress with STAR Math at least once a month.

The content for STAR Math is based on an analysis of professional standards, curriculum materials, test frameworks, and content-area research, including best practices for mathematics instruction. The STAR Math item bank includes 214 core math objectives, with multiple items available to measure each objective. Figure A3 shows a sample assessment item.

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7 STAR Math may also be used with kindergarten students, though the assessment has not been normed for this age group. Students are ready to test in STAR Math when they have a 100-word sight vocabulary, which for some students may not occur until later in first grade.
Appendix B: Sample Key Reports

On the following pages are sample key reports\(^8\) for use with Accelerated Math for Intervention:

- STAR Math Student Progress Monitoring Report
- STAR Math Screening Report
- Accelerated Math Diagnostic Report
- Accelerated Math Status of the Class Report
- MathFacts in a Flash Student Progress Report

The complete menu of reports available for the Accelerated Math for Intervention software components is found in a separate publication from Renaissance Learning, Key Report Samples, available online from http://doc.renlearn.com/KMNET/R003563228GE7E80.pdf or by request to (800) 338-4204.

\(^8\) Reports are regularly reviewed and may vary from those shown as enhancements are made.
After the teacher selects a goal for the student, the goal line projects an intervention outcome, and the trend line shows the student's actual progress toward that goal.

Page 1 of this report graphs a student's scores in relation to the goal, giving the teacher a picture of the student's progress.
Screening is the first step in RTI. Use this report for grade-level planning and identifying students who need the most help.

These students are all below benchmark.

Use these key questions to help determine next steps.

In a typical RTI implementation, about 80% of students will be served by Tier 1. In this school, about 20% need additional attention in Tier 2 or Tier 3 interventions.
This example shows 14 high school students in a Tier 2 class period, using appropriate grade level Accelerated Math libraries as part of their intervention program.

This student may be struggling too much; Kristina would be more successful working in a lower level AM library.

Students working in lower-level libraries should be mastering more objectives than they would if working at grade-level.

Students working in Accelerated Math as part of their Tier 2 or 3 program will master most of their initial objectives on Diagnostic Tests.

To aid with instructional planning, the report helps identify which math objectives are causing the most difficulty for students. Accelerated Math provides the data to differentiate student practice. Provide targeted instruction to help students having problems with specific objectives.
**Status of the Class Report**

**School:** Oakwood Elementary School

**Class:** Math 4A  
**Teacher:** Adams, Marcie

**Group Name:** Class

**Assignment Status**

<table>
<thead>
<tr>
<th>Student</th>
<th>Assignments</th>
<th>Objectives</th>
<th>Last Assignment Completed</th>
<th>Outstanding Assignments</th>
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</thead>
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<td>2</td>
<td>Practice 03/11/11</td>
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<tr>
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<td>03/14/11</td>
</tr>
<tr>
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<td>Intervene (2)</td>
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<td>03/14/11</td>
</tr>
<tr>
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</tr>
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<td>3</td>
<td>Practice 03/14/11</td>
<td>03/14/11</td>
</tr>
<tr>
<td>Halden, Susan</td>
<td>Intervene (2)</td>
<td>1</td>
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</tr>
<tr>
<td>O’Neill, Sarah</td>
<td>Assign Obj</td>
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<td>03/11/11</td>
</tr>
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<td>03/14/11</td>
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</table>

**Intervention Needed**

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<tr>
<th>Student</th>
<th>Assignment Type</th>
<th>Objectives</th>
<th>Library Objective Code</th>
<th>Overall Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bollig, Brandon</td>
<td>Practice</td>
<td>90. Generate a table of paired numbers based on a rule</td>
<td>DMG4-090</td>
<td>11 / 18 (61%)</td>
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<tr>
<td></td>
<td>Practice</td>
<td>91. Determine a rule that relates two variables</td>
<td>DMG4-081</td>
<td>12 / 18 (67%)</td>
</tr>
<tr>
<td></td>
<td>Regular Test</td>
<td>96. Convert between customary units of weight using whole numbers</td>
<td>DMG4-096</td>
<td>6 / 10 (60%)</td>
</tr>
<tr>
<td></td>
<td>Regular Test</td>
<td>97. Convert between metric units of capacity using whole numbers</td>
<td>DMG4-097</td>
<td>5 / 10 (50%)</td>
</tr>
</tbody>
</table>

*Diagnostic Test*
Jeremy took each test multiple times. Best Time shows the lowest time it took Jeremy to meet the mastery criteria for the level.

The target date for the benchmark level is April 1.

Date Mastered lists the date the level was originally mastered. This date matches the level mastered symbol in the graph.
References


REFERENCES


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Acknowledgments

Renaissance Learning sincerely thanks the following individuals for sharing their expertise in consultation on our mathematics tools.

**Sybilla Beckmann, Ph.D.** is a professor of mathematics at the University of Georgia. She is especially interested in helping college faculty learn to teach mathematics content courses for elementary and middle grades teachers and has developed three courses for prospective elementary school teachers at the University of Georgia. She has written a book for such courses, *Mathematics for Elementary Teachers*, published by Addison-Wesley, now in a second edition. Beckmann was a member of the writing team for the NCTM's *Curriculum Focal Points for Prekindergarten Through Grade 8 Mathematics* and has worked on the development of several state mathematics standards.

**Richard Bisk, Ph.D.** is chair and professor of mathematics at Worcester State College in Massachusetts, where he teaches mathematical modeling, linear algebra, number theory, and mathematics for elementary teachers. He has worked with K–12 teachers and students for 15 years and has taught and developed numerous professional development courses that focus on improving teacher understanding of mathematics, including the Singapore Math Project, which was developed in conjunction with the Massachusetts Department of Education. Bisk also presented testimony before the National Math Panel in September 2006 regarding the need to improve preservice elementary teacher knowledge of the mathematics they teach. And he assisted in the development of Massachusetts’s new guidelines for the mathematical preparation of elementary teachers.

**Matthew K. Burns, Ph.D.** is a professor of educational psychology, coordinator of the School Psychology Program, and co-director of the Minnesota Center for Reading Research at the University of Minnesota. Burns has published over 150 articles and book chapters in national publications, and has co-authored or co-edited several books. He is also the editor of *School Psychology Review* and past editor of *Assessment for Effective Intervention*. Specific areas in which Burns has conducted research include response to intervention, assessing the instructional level, academic interventions, and facilitating problem-solving teams.

**Thomas P. Hogan, Ph.D.** is a professor of psychology and a Distinguished University Fellow at the University of Scranton. He has more than 40 years of experience conducting reviews of mathematics curricular content, principally in connection with the preparation of a wide variety of educational tests, including the Stanford Diagnostic Mathematics Test, Stanford Modern Mathematics Test, and the Metropolitan Achievement Test. Hogan has published articles in the *Journal for Research in Mathematics Education* and *Mathematical Thinking and Learning*, and has authored two textbooks and more than 100 scholarly publications in the areas of measurement and evaluation. He has also served as consultant to a wide variety of school systems, states, and other organizations on matters of educational assessment, program evaluation, and research design.

**R. James Milgram, Ph.D.** is a professor of mathematics at Stanford University. His work in mathematics education includes consulting with several states on math standards, including California. Milgram has given lectures around the world and is a member of numerous boards and committees, including the National Board of Education Sciences, created by the Education Sciences Reform Act of 2002 “to advise and consult with the Director of the Institute of Education Sciences (IES) on agency policies,” and the Human Capital Committee of the NASA Advisory Council, which “provides the NASA Administrator with counsel and advice on programs and issues of importance to the Agency.” Milgram is author of “An Evaluation of CMP,” “A Preliminary Analysis of SAT-I Mathematics Data for IMP Schools in California,” and “Outcomes Analysis for Core Plus Students at Andover High School: One Year Later.” Each of these papers identifies serious shortcomings in popular mathematics programs.
Sharif M. Shakrani, Ph.D., is a private consultant and researcher specializing in measurement and quantitative methods. Shakrani is a former co-director of the Education Policy Center at Michigan State University and professor of measurement and quantitative methods in the Department of Counseling, Educational Psychology and Special Education. Before coming to Michigan State University, Shakrani served 8 years as the deputy executive director of the National Assessment Governing Board in the U.S. Department of Education. He was responsible for technical and policy direction for the National Assessment of Educational Programs (NAEP). He has also worked for the National Center for Education Statistics in the U.S. Department of Education where he guided the design and analysis of federal educational assessments. In his work in the Michigan Department of Education, Shakrani was responsible for K–12 general curriculum and assessment and was instrumental in revising the Michigan Educational Assessment Program (MEAP).

Edward S. Shapiro, Ph.D., is a professor of school psychology and director of the Center for Promoting Research to Practice in the College of Education at Lehigh University. He is the 2006 winner of the American Psychological Association’s Senior Scientist Award, was recognized in 2007 by the Pennsylvania Psychological Association, and recently received Lehigh University’s Eleanor and Joseph Lipsch Research Award. Shapiro has authored 10 books and is best known for his work in curriculum-based assessment and non-standardized methods of assessing academic skills problems. Among his many projects, Shapiro co-directs a federal project focused on the development of a multi-tiered, RTI model in two districts in Pennsylvania, and he has recently been awarded a U.S. Department of Education grant to train school psychologists as facilitators of RTI processes. He is also currently collaborating with the Pennsylvania Department of Education in developing and facilitating the implementation of the state’s RTI methodology.

Amanda M. VanDerHeyden, Ph.D., is a private consultant and researcher who has worked as a researcher, consultant, and national trainer in a number of school districts and published more than 60 scholarly articles and book chapters related to RTI. In 2006, VanDerHeyden was named to a National Center for Learning Disabilities advisory panel to provide guidance related to RTI. She is associate editor of School Psychology Review, serves on the editorial boards of several journals including School Psychology Quarterly and Journal of Early Intervention, author of Essentials of Response to Intervention (with Dr. Matthew Burns) and Keeping RtI on Track: How to Identify, Repair, and Prevent Mistakes that Derail Implementation RtI (with Dr. David Tilly), and co-editor of the Handbook of Response to Intervention. VanDerHeyden received the 2006 Lightner Witmer Early Career Contributions Award from the APA for her scholarship on early intervention, RTI, and models of data-based decision making. She serves as research advisor to iSTEPP, a web-based data management system.

Kenneth E. Vos, Ph.D., is a professor of education at St. Catherine University in St. Paul, Minnesota. For the last 35 years, he has been preparing undergraduate and graduate students to teach mathematics, and in tandem working with classroom teachers. Vos has directed numerous programs and institutes for teachers on mathematics, best practices in the mathematics classroom, and assessment. He holds a Ph.D. in mathematics education from the University of Minnesota.
James Ysseldyke, Ph.D., is Emma Birkmaier Professor of Educational Leadership in the Department of Educational Psychology at the University of Minnesota. He has been educating school psychologists and researchers for more than 35 years. Ysseldyke has served the University of Minnesota as director of the Minnesota Institute for Research on Learning Disabilities, director of the National School Psychology Network, director of the National Center on Educational Outcomes, director of the School Psychology Program, and associate dean for research. Professor Ysseldyke’s research and writing have focused on enhancing the competence of individual students and enhancing the capacity of systems to meet students’ needs. He is an author of major textbooks and more than 300 journal articles. Ysseldyke is conducting a set of investigations on the use of technology-enhanced progress-monitoring systems to track the performance and progress of students in urban environments. Ysseldyke chaired the task forces that produced the three Blueprints on the Future of Training and Practice in School Psychology, and he is former editor of Exceptional Children, the flagship journal of the Council for Exceptional Children. Ysseldyke has received awards for his research from the School Psychology Division of the American Psychological Association, the American Educational Research Association, and the Council for Exceptional Children. The University of Minnesota presented him a distinguished teaching award, and he received a distinguished alumni award from the University of Illinois.
James Ysseldyke, Ph.D., is Emma Birkmaier Professor of Educational Leadership in the department of Educational Psychology at the university of Minnesota. He has been educating school psychologists and researchers for more than 35 years. Ysseldyke has served the university of Minnesota as director of the Minnesota institute for research on Learning disabilities, director of the national School Psychology network, director of the national center on Educational outcomes, director of the School Psychology Program, and associate dean for research. Professor Ysseldyke's research and writing have focused on enhancing the competence of individual students and enhancing the capacity of systems to meet students' needs. He is an author of major textbooks and more than 300 journal articles. Ysseldyke is conducting a set of investigations on the use of technology-enhanced progress-monitoring systems to track the performance and progress of students in urban environments. Ysseldyke chaired the task forces that produced the three Blueprints on the Future of Training and Practice in School Psychology, and he is former editor of Exceptional Children, the flagship journal of the council for Exceptional children. Ysseldyke has received awards for his research from the School Psychology division of the American Psychological association, the American Educational Research association, and the council for Exceptional children. The university of Minnesota presented him a distinguished teaching award, and he received a distinguished alumni award from the university of Illinois.
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**Sybilla Beckmann, Ph.D.,** is a professor of mathematics at the University of Georgia.

**Sharif M. Shakrani, Ph.D.,** is a private consultant and researcher specializing in measurement and quantitative methods.

**Richard Bisk, Ph.D.,** is chair and professor of mathematics at Worcester State College in Massachusetts.

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**Matthew K. Burns, Ph.D.,** is a professor of educational psychology, coordinator of the School Psychology Program, and co-director of the Minnesota Center for Reading Research at the University of Minnesota.

**Amanda M. VanDerHeyden, Ph.D.,** is a private consultant and researcher who has worked as a researcher, consultant, and national trainer in a number of school districts.

**Thomas P. Hogan, Ph.D.,** is a professor of psychology and a Distinguished University Fellow at the University of Scranton.

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Teacher’s Guide to Accelerated Math for Intervention

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  - Rocklin High School
  - Rocklin Alternative Education Center
  - Parker Whitney Elementary
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