6 Critical Components of a Strong Math Intervention Program

The Ascend Math Model

Developed By:

Strategic Education Solutions
6718 Rustling Oaks Trail
Austin, TX 78759
www.strategicedsolutions.com

Background

In 2004, the Individuals with Disabilities Education Improvement Act (IDEA) emphasized the use of Response to Intervention (RTI) as a more accurate way of diagnosing students with learning disabilities. Both the IDEA and its counterpart, the No Child Left Behind Act (NCLB) sought to minimize the number of students incorrectly classified as learning disabled by providing a tiered system of diagnosis and intervention for students. If student learning deficiencies could be corrected through instructional intervention, then (according to IDEA and NCLB) those deficiencies had likely been the result of poor instruction rather than a true disability. In addition, RTI has come to represent for educators an end to the "wait to fail" model, in which academic deficiencies remain un-diagnosed and un-mediated until the student reaches a critical level of failure (Ogonosky, 2008; McInerney & Elledge, 2013; Al Otaiba, 2014; "Essential components," 2010).

RTI provides a tiered model for student instruction and assessment. The law does not stipulate a particular configuration, number of hours, or delivery method for any intervention tier, leaving such decisions to individual schools and/or districts. This flexibility is important because each school may operate somewhat differently based on a variety of factors, such as state and local education regulations, class schedules, staff configurations, and administrative policies and procedures (McInerney & Elledge, 2013; Fuchs, Fuchs, & Compton 2012). While this flexibility is needed, it has also created some confusion as to the "optimal" configuration and frequency of assessment and interventions within a specific RTI framework. This white paper presents an approach to RTI that reflects the general consensus found in research on effective Response to Intervention programs.

Essential Components of an Effective RTI System

As previously stated, the specifics of RTI may appear slightly different from state to state, district to district, and even school to school. However, researchers generally agree on several essential components that must be present in an effective RTI system.

1. Tiered Intervention

Researchers agree that a tiered system of intervention is critical to an effective RTI system (Ogonosky, 2008; Ogonosky, 2013; McInerney & Elledge, 2013; Fuchs, Fuchs, & Compton 2012; "Tiered interventions," 2010; "Essential components," 2010; Smith & Okolo, 2010; "Student assessment," 2011; Gersten, et al, 2009). What is often called Tier 1, Level 1, or Primary Intervention is, in essence, regular classroom instruction. Teachers deliver research-based, differentiated instruction to all students (Ogonosky, 2008; McInerney & Elledge, 2013; Fuchs, Fuchs, & Compton 2012; "Essential components," 2010; Gersten, et al, 2009).

Based on Universal Screening implemented in Tier 1 (described below), students that do not respond adequately to core classroom instruction are moved to Tier 2 Intervention. At this Tier, the intensity of both assessment and instruction intensifies. In Tier 2, significant baseline data collection/diagnostic assessment occurs to pinpoint specific areas in which additional, differentiated, individualized instruction is needed (Ogonosky, 2008; Fuchs, Fuchs, & Compton 2012). As the student progresses through the intervention, curriculum-based and other measures are used frequently to determine whether the student is

progressing faster than expected, as expected, or slower than expected compared to clearly-defined student outcome measures. Based on this data, students may be moved back to Tier 1 (general classroom instruction), may remain in Tier 2, or may be moved to Tier 3 for more intensive intervention.

Perhaps one of the most important aspects of Ascend Math is its ability to empower teachers and administrators to engage in detailed analysis of student progress and make timely decisions about placement. State assessments are given yearly (and frequently, the results of those assessments are not available to schools until late in the first semester). With Ascend Math, teachers and administrators can view student progress much more frequently and make decisions about which students may need more or less time on Ascend to fill in skill gaps or achieve desired progress goals.

Ascend Math's adaptive level recommendation assessment properly places students at their individual functional level. While some mathematics interventions require students to progress through a preset, full course of instruction, regardless of whether particular concepts have or have not been mastered by the individual student, Ascend Math is fully individualized. Students are placed at their appropriate place of difficulty and because Ascend Math focuses only on those key areas, students begin to see success immediately. As students progress through their continuously adapted learning plans, Ascend Math automatically removes learning objectives for which they demonstrate mastery on a pre assessment—infusing an ever-greater level of individualization.

Students who do not respond to Tier 2 Intervention as illustrated by routine and frequent progress monitoring may be moved to Tier 3 Intervention. Tier 3 Intervention is characterized by an increase in both frequency and duration of assessments and interventions implemented at Tier 2 ("Essential components," 2010). Typically, failure to respond to Tier 3 Intervention results in a referral for Special Education Services. Thus, it is critical that, as in Tier 2, intervention is implemented with absolute fidelity and that this fidelity is clearly supported through documentation (Ogonosky, 2008; "Essential components," 2010). As in Tier 2, instruction is individualized to meet the specific needs of the individual student. Of note, Tier 3 Intervention may require significant flexibility on the part of the school to implement in terms of class scheduling and staff availability in order to accommodate the increased intensity of the intervention (Ogonosky, 2008).

Ascend Math is completely individualized, enabling students to move seamlessly between intervention tiers as needed. Ascend Math's computer-based instruction greatly reduces challenges associated with increasing/decreasing intervention intensity as needed and with managing groups of students needing multiple levels of intensity simultaneously.

For example, students in Tier 2 may utilize Ascend Math two to three times per week. Tier 3 students may have a full class period each day dedicated to math intervention. Tier 3 students who respond well to the intervention may be moved to a Tier 2 class without any disruption in their individual study plans. Those students requiring an increase in intensity may be assigned to the daily intervention class.

Ascend Math offers a variety of means of support to ensure the program is implemented with fidelity. Ascend Math reports provide real time student usage and growth data. Teachers can track student progress and usage and set progress goals according to Tier. For example, Tier 2 students may have a goal

to complete one to two learning objectives per hour worked; while Tier 3 students may complete one to two learning objectives per two hours worked.

The student interface also provides motivational features that allow students to set goals and track progress. Teacher reporting and progress monitoring is designed to facilitate open communication between students and teachers in order to more effectively and efficiently gauge progress.

In addition, Ascend can be accessed anytime, anywhere—within the classroom, in computer labs, before/after school, and even from home, providing school staff significant flexibility to ensure that students receive the intensity needed to meet progress goals without over-taxing the school schedule and staff.

2. Universal Screening

Universal screening is seen as a critical part of any RTI program (Ogonosky, 2008; Ogonosky, 2013; McInerney & Elledge, 2013; Fuchs, Fuchs, & Compton 2012; "Tiered interventions," 2010; "Essential components," 2010; Smith & Okolo, 2010; "Student assessment," 2011; Gersten, et al, 2009). It is implemented as part of Tier 1 Intervention with *all* students to identify current and/or potential academic deficits ("Essential components," 2010; Smith & Okolo, 2010; Witzel, 2010).

Universal screening instruments may include Curriculum-Based Measures (CBMs), state assessments, district assessments, and other assessments as determined by the school's RTI team (Ogonosky, 2008). Some researchers suggest that a single-stage screening may result in a high level of false-positives or false-negatives, unnecessarily increasing a school's investment in RTI or under-identifying students and unacceptably delaying their access to needed interventions. To avoid this challenge, these researchers recommend a two-stage screening, in which the cut point is set sufficiently high so as to eliminate students who clearly are not in need of intervention. This is followed by a second, more detailed assessment of students who did not meet the cut point on the first assessment (Fuchs, Fuchs, & Compton, 2012; "Essential components," 2010; "Student assessment," 2011).

An effective Universal Screening process should *quickly* and *accurately* determine which students to target for intervention and identify *specific* gaps between student performance and expected instructional outcomes (Ogonosky, 2008; McInerney & Elledge, 2013; Gersten, et al, 2009). Universal Screening instruments should also be easy to administer and analyze, presenting data in a way that facilitates instructional decisions. This also ensures that universal screening occurs with *fidelity*—that teachers and/or school staff are consistent and timely in their screening (Ogonosky, 2008; McInerney & Elledge, 2013; "Tiered interventions," 2010).

Ascend Math can play an important role in multi-stage universal screening. Following a stage 1 "high level" screening, schools can administer Ascend's adaptive Level Recommendation assessment to identify quickly and efficiently students performing significantly below grade level. Because Ascend is aligned to each state's chosen standards and/or assessment objectives, teachers and administrators can view students' proficiency status in terms of standards in their state. Diagnostic assessments then pinpoint students' performance across mathematics domains and objectives to provide a comprehensive, accurate

picture of current levels of performance and to automatically create a fully-individualized intervention plan for each student.

For example, in a Maryland middle school, administrators selected a set of students who had not made adequate progress on the state mathematics test in previous years. These students were administered Ascend's diagnostic assessment, which found that 97% of the students tested at least one grade below grade level, and that 70% of those students tested three or more grades below their current academic grade. (See Appendix B, Holabird STEM Program) This data supported the accuracy of Ascend's diagnostic assessment in confirming the need for intervention in the majority of students selected. The results of the assessment allow districts to place students in Tier 2 or Tier 3 according to results and begin targeted, individualized intervention in a "time is of the essence" manner.

3. Individualized Instruction

At Tier 1, it is assumed that regular classroom instruction incorporates *differentiated* learning—specific strategies, tools, or approaches that meet the varied needs present within a typical heterogeneous classroom (Ogonosky, 2008; McInerney & Elledge, 2013; Fuchs, Fuchs, & Compton 2012; "Essential components," 2010; Gersten, et al, 2009). Tier 2 Interventions typically feature *individualized* instruction. Whereas differentiation at Tier 1 assumes that a variety of instructional strategies will meet the needs of most students, at Tier 2, intervention becomes specifically tailored *to each individual student*. Individualization includes attention to both learning style—how a student learns best—and content—what a student needs to learn (Ogonosky, 2008).

Tier 2 Interventions should be targeted to the student's actual level of performance rather than his/her grade level, and should reflect the reality that a single student may be functioning at a variety of instructional levels within and across subject areas and across domains within a subject area (Fuchs, Fuchs, & Compton 2012). If a student does not respond to Tier 2 intervention (despite fidelity of implementation), he/she progresses to Tier 3. Tier 3 intervention require significantly more individualized intervention, combining some aspects of Tier 2 intervention with additional instructional content and/or strategies based on specific student needs, as well as increased intervention time (Fuchs, Fuchs, & Compton 2012; "Essential components," 2010).

Ascend Math is one of the few math intervention programs to provide a truly individualized study plan for each student. Based on the results of the diagnostic assessment, Ascend teachers may address multiple levels of intervention within a single classroom. A single Ascend Math classroom of 8th graders may at one time have 67% of students working at a third grade level in math, 19% at a grade fourth grade level, and the remaining students spread out between fifth and seventh. (See Appendix B, Holabird STEM Program.) Ascend Math reaches each student at his or her functional grade level, addressing individual skill gaps.

Once the student has been assigned to a level, he or she takes a pre assessment over the first unit of instruction. Ascend automatically removes learning objectives in which the student is proficient. Any non-mastered objectives indicated by the student's pre assessment scores will become the student's personal learning study plan. Therefore, using the appropriate state standards, Ascend Math automatically individualizes instruction and assigns each student a carefully-articulated study plan based on pre

assessment results. The ability to automatically guide students through an individual study plan addresses each student's unique response to intervention requirements.

Each student receives a rich, differentiated learning experience through Ascend's technology. Lessons include:

- video-based direct instruction by mathematics education experts;
- motivational, audio-supported examples of mathematics concepts;
- interactive exploration using visually-rich manipulative tools;
- traditional practice with opportunity for re teaching;
- assessment to ensure generalization of skills.

Ascend Math's variety of instructional experiences addresses the needs of visual learners, auditory learners, kinesthetic learners, English Language Learners, and special education students. Students progress at their own pace through the program, and learning pathways are adjusted automatically as skills and concepts are mastered. Ascend meets students at their actual level of mastery—identifying skill gaps and tailoring instruction to focus on the most-needed content.

4. Progress Monitoring

Progress monitoring refers to the process of frequently gathering student achievement data, analyzing the data in a timely, repeatable manner, and making sound instructional/intervention decisions based on the data. As students move through the tiers of intervention, the frequency and intensity of progress monitoring intensifies (Ogonosky, 2008; McInerney & Elledge, 2013; "Tiered interventions," 2010; "Essential components," 2010; Smith & Okolo, 2010; Gersten, et al, 2009).

To support the frequency and intensity of progress monitoring, assessments should be brief, repeatable, reliable, valid, and highly sensitive to even small changes in proficiency. They should enable the presentation of data in visual representations that are quickly and easily understood by stakeholders to facilitate agile instructional decisions. They should also use readily-available materials, feature standardized administration and scoring techniques, and be easy to implement in order to facilitate fidelity (Ogonosky, 2008).

Using embedded, continual assessment, student progress can be captured on demand at any point in the student's learning plan. In addition, the frequency of data collection and analysis can be customized for each student and based on each school's specific staff and schedule limitations. Ascend's formative and summative assessments require no special materials or time consuming set up and are fully automated to ensure uniform administration, and present results in easy-to-understand visuals that are consistent for students, classes and schools.

Another critical factor in progress monitoring is that the data collected clearly illustrate student performance at its actual level—not at the level where the core curriculum is being taught (Ogonosky, 2008). That is, assessments must illustrate, within and across subject areas and domains within subject areas the student's actual level of performance—be it one or more levels below grade level, at grade level, or one or more levels above grade level.

Beginning with its diagnostic assessment, Ascend Math identifies the grade level at which each student is actually performing. Once the student has been assigned to a level, he/she takes a pre assessment over the first unit of instruction. Ascend automatically removes learning objectives in which the student is proficient. Any non-mastered objectives indicated by the student's pre assessment results become the student's individual study plan. As the student progresses through his or her study plan, the embedded assessments continually monitor progress within math objectives and across grade levels, automatically adjusting the student's learning plan to focus instruction on advancing the student as efficiently as possible. Ascend Math automatically advances students through functional levels. Comprehensive reports allow administrators to gauge level advancement and determine the effectiveness of the intervention. For example, in Crisp County Middle School 41% of the students using Ascend Math completed two or more levels and forty-five students out of 112 attained their grade level goal within one year. (See Appendix B: Crisp County Middle School.)

5. Data-Based Decision Making

As previously discussed, an effective RTI system incorporates frequent assessment and progress monitoring at each phase of implementation. However, it is also critical to *use* the data to inform decisions made at multiple points within the intervention process and, conversely, to ensure that every decision made is supported with clear and comprehensive data (Ogonosky, 2008; McInerney & Elledge, 2013; "Tiered interventions," 2010; "Essential components," 2010; Smith & Okolo, 2010; Gersten, et al, 2009). This is one of the most challenging aspects of RTI to implement with fidelity, as it requires schools to create a clear statement of outcome measures and a comprehensive system of coordinated assessments used to track outcomes over time prior to implementing the intervention system (Ogonosky, 2008). This type of comprehensive framework facilitates the consistent and effective implementation of RTI within and across schools and districts and creates a mechanism by which assessment and intervention fidelity can be measured and documented (Ogonosky, 2008; McInerney & Elledge, 2013). In order for data-based decision making to be effective and consistent, it is critical that assessments used be uniform—teacher-to-teacher variations in assessment procedures can undermine the integrity of data used to make decisions about the RTI process and the interventions used (Ogonosky, 2008).

Ascend Math provides a variety of mechanisms by which achievement of outcome measures and fidelity of implementation can be measured and documented. Easy-to-use reports compare student time on task and learning objectives mastered. This report ensures proper usage. Other formative reports track post test versus pre test scores to ensure that students achieve math competency as described in individualized learning plans. Summative assessments are aligned to local and state standards and high-stakes assessment objectives, allowing Ascend Math to be integrated seamlessly into a school's or district's overall RTI program. The automaticity of administration ensures that the data gathered are accurate, consistent and descriptive. Further, Ascend's reporting tools enable school staff to view and document student progress to make productive, agile decisions about student placement and intervention effectiveness.

Data-based decision making often focuses on Responsiveness to Intervention, defined as the rate of improvement a student achieves through an intervention that is delivered with fidelity (Ogonosky, 2013; Fuchs, Fuchs, & Compton 2012; "Essential components," 2010). It can be seen as a slope, which, when overlaid with the clearly-defined expected outcomes of the student, can aid teachers in evaluating whether

the student is making sufficient progress. If the student does not respond as expected, further individualization/differentiation must be implemented ("Essential components," 2010). Responsiveness to intervention is an essential component of data-based decision making.

Ascend Math enables school staff to view individual student and group progress and compare it with the goals of the RTI program. For example, a school may set student usage guidelines for students who are borderline between Tier 1 and Tier 2 intervention, another for Tier 2 students, and yet another for Tier 3 students. At any time, the Ascend Math Activity Report enables school staff to monitor and document each student's (and groups of students') status with respect to these guidelines.

6. Intervention Fidelity/Integrity

Fidelity of implementation, sometimes referred to as "Intervention Integrity" simply means that the intervention is implemented in the way it was designed. Researchers emphasize the importance of fidelity at all tiers of intervention and throughout all essential components of the RTI system (Ogonosky, 2008; Ogonosky, 2013; McInerney & Elledge, 2013; "Essential components," 2010). If an intervention has a research base supporting, for example, a particular duration, frequency, length of session, etc., then the intervention must be conducted as it was in the research studies in order to meet the "fidelity" criterion ("Essential components," 2010).

Intervention Integrity is important because failure to implement with fidelity can result in a number of undesired/unintended outcomes. For example, failure to implement with fidelity may unintentionally impede the progress of the student through the intervention. It may also falsely implicate the student's learning ability—rather than the implementation of the intervention—in his/her failure to progress (Ogonosky, 2008). In addition, placements, decisions, and outcomes of an RTI program as a whole cannot be supported unless fidelity of implementation is clearly documented (Ogonosky, 2013).

Ascend Math has been successfully implemented with consistent results in a variety of use models. Some schools use Ascend as the cornerstone of a second math elective. Others use Ascend in regularly-scheduled math labs or in block periods. Ascend has tracked and documented the success of students using any of these instructional configurations (See Appendix B). For example:

- In a middle school in which students use Ascend as a second math elective 67% of sixth graders, 56% of seventh graders, and 75% of eighth graders gained a full grade level of progress within a single quarter.
- In a high school in which students use Ascend in math labs approximately four hours per week, numerous students progressed through two grade levels and some students progressed through three within a single school year.
- In a middle school in which students use Ascend in block periods approximately two to three hours per week, 41% of students completed 2 or more levels within a single school year; 45 students using Ascend reached their grade level.

The automaticity of Ascend's progress recording and reporting also facilitates schools' ability to implement with fidelity and to document the implementation. School staff are able to retrieve and analyze hours worked and levels gained by individual students, classes/groupings, grade levels, and schools.

Challenges in RTI Implementation

In addition to highlighting essential components and critical characteristics of successful RTI implementation, researchers have found consistent challenges, even in the most experienced schools and districts.

1. Cost

A significant challenge to the development and implementation of a comprehensive RTI program is its cost. One source of cost savings could be the use of a multi-stage universal screening process, which is designed to more accurately identify students truly at risk and in need of intervention. It has also been suggested that "fast tracking" students from Tier 1 to Tier 3 intervention based on the significance of academic deficit may reduce cost by eliminating a likely-ineffective (and expensive) Tier 2 intervention (Fuchs, Fuchs, & Compton 2012). In addition, carefully considering efficiency/cost effectiveness when selecting assessments and interventions can reduce cost.

A key benefit of Ascend Math is its cost effectiveness. Because it is technology-based, it requires no additional materials to implement (either in terms of assessment or instruction). In addition, the program is easily scalable—allowing students to accelerate or decelerate as needed and to move among intervention tiers without financial or logistical impact.

2. Time

Staff time—to receive adequate training, implement assessments, provide instruction, and monitor progress within an RTI program—is also a significant challenge for schools (Fuchs, Fuchs, & Compton, 2012; "Tiered interventions," 2010; Louie, et al, 2008). Compounding this challenge, some schools may not have dedicated intervention staff, requiring instructional staff to pull "double-duty" ("Tiered interventions," 2010; Louie, et al, 2008). Some researchers have indicated that the use of technology-based instruction can reduce the amount of direct instructional time staff spend, freeing up more time for progress monitoring and focused data analysis (Smith & Okolo, 2010).

Ascend Math is an easy-to-use system, requiring little start-up training for teachers and school staff. The automaticity of the Ascend Math reporting system significantly reduces the amount of time needed to view, analyze, and act on data, increasing response time to student progress and maximizing instructional resources. In addition, the system can be accessed from a variety of locations at any time, and students can complete instruction independently, significantly reducing the time burden on school staff.

3. Class Configuration

Researchers also indicate that finding flexibility in the class schedule to accommodate Tier 2 and Tier 3 intervention alongside regular classroom instruction is a significant challenge. This challenge is particularly acute at the high school level ("Tiered interventions," 2010). In addition, when a Tier 2 or Tier 3 intervention is allocated as a separate elective (typically for a semester), some students may progress *beyond* their targets on one or more outcome measures prior to the end of the semester. This

either results in an unintentional slow-down of the student's progress/potential, or requires the teacher to gather additional materials to teach to the student's level until the semester is finished ("Tiered interventions," 2010).

One of the important distinctions of Ascend—particularly in relation to RTI—is that it can be used extremely flexibly, depending on the needs and resources of individual schools and districts. Schools have used Ascend in second math electives, math labs, and block periods, among other models. In the event that students do move beyond their actual level, Ascend Math also allows students to accelerate learning. Appendix B describes three such implementations to illustrate how consistent results can be achieved across a wide variety of use models. In addition, because Ascend is entirely individualized and self-paced, students' progress is not dependent on the progress of other students, the available time and resources of the teacher, or the availability of a particular class configuration.

Appendix A: References

Al Otaiba, S. (2014). "Waiting to fail" redux: Understanding inadequate response to intervention. *Learning Disability Quarterly*, 37(3), 129-133.

Fuchs, D., Fuchs, L. S., & Compton, D. L. (2012). Smart RTI: A next-generation approach to multilevel prevention. *Exceptional Children*, 78(3), 263-279.

Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). *Assisting students struggling with mathematics: Response to Intervention (RtI) for elementary and middle schools* (NCEE 2009-4060). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/.

Louie, J., Brodesky, A., Brett, J., Yang, L.-M., and Tan, Y. (2008). *Math education practices for students with disabilities and other struggling learners: case studies of six schools in two Northeast and Islands Region states* (Issues and Answers Report, REL 2008–No. 053). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northeast and Islands. Retrieved from http://ies.ed.gov/ncee/edlabs.

McInerney, M. & Elledge, A. (2013). *Using a response to intervention framework to improve student learning: A pocket guide for state and district leaders*. Washington, DC: American Institutes for Research.

National Association of Elementary School Principals. (2011). *Student assessment: Response to intervention in elementary-middle math* [White paper]. Retrieved from: http://www.naesp.org/sites/default/files/Math_Intervention_0.pdf

National Center on Response to Intervention. (March 2010). *Essential components of RTI: A closer look at response to intervention*. Washington, DC: U.S. Department of Education, Office of Special Education Programs, National Center on Response to Intervention.

National Council of Teachers of Mathematics. (2007). *Effective strategies brief: Effective strategies for teaching students with difficulties in mathematics*. [White paper]. Downloaded from: http://www.nctm.org/uploadedFiles/Research_News_and_Advocacy/Research/Clips_and_Briefs/Research_brief_02_-_Effective_Strategies.pdf

National High School Center, National Center on Response to Intervention, and Center on Instruction. (2010). *Tiered interventions in high schools: Using preliminary "lessons learned" to guide ongoing discussion.* Washington, DC: American Institutes for Research.

Ogonosky, A. (2008). *The response to intervention handbook: Moving from theory to practice*. Austin, TX: Park Place Publications.

Ogonosky, A. (2013, May). *RtI: what schools dream for; what schools need*. Session presented at D.R.E.A.M: Discovering the Reality of Educating All Minds.

Smith, S. J. & Okolo, C. (2010). *Response to intervention and evidence-based practices: Where does technology fit?* Learning Disability Quarterly, 33(4), 257-272.

Witzel, B. S. (2010) *Fitting the response to intervention framework with mathematics education*. LD Online, http://www.ldonline.org/article/41282/.

Appendix B: RTI Standard Protocols: Ascend Mathematics

The use of standard protocols with specific interventions can facilitate their implementation with fidelity. A standard protocol clearly defines critical factors, such as the intensity and duration of the intervention and the setting in which it is implemented. When implemented with fidelity, replication of this protocol should yield results commensurate with past implementations (Ogonosky, 2008).

Ascend Mathematics has carefully monitored and documented the implementation of its intervention in three specific settings: Second Math Elective, Block Periods, and Math Labs. The following protocols illustrate the configuration, duration, and intensity of the intervention and the results achieved.

1. Second Math Elective

Overview

Students requiring intervention are placed in a second mathematics elective, using Ascend Math as the intervention curriculum. Some schools use para-professionals to monitor students. Some students will return to other electives after posting desired gains.

Intervention Intensity

Intervention periods range from nine to eighteen weeks; students use Ascend Math for one full class period up to three times per week.

Resources Required

Students may be monitored by classroom teachers, intervention specialists, or para-professionals. A one-to-one student-to-computer ratio is required.

Implementation Snapshot: Holabird STEM Program, Baltimore County, MD

Number of Students Using Ascend: 222 Number of Teachers Using Ascend: 3

Core Program Goal: Students exhibited significant mathematics knowledge gaps, particularly those in special education. Most were missing foundational knowledge from which to build more advanced mathematics concepts. The school adopted Ascend to provide students an opportunity to rebuild functional skills and make them more competitive with their grade level peers.

Screening Process:

1. School staff analyzed results from Maryland School Assessment (MSA) and Measures of Academic Progress (MAP) data during the spring of 2013, identifying 200 students scoring *Basic* on the MSA. These students were targeted for intervention.

2. Students targeted for intervention completed Ascend's Level Recommendation Test to diagnose current mathematics level. Approximately 97% of the students tested at least one grade below grade level, with about 70% of those students testing three or more grades below their current academic grade.

Intervention Grouping: Thirteen sections of sixth, seventh, and eighth grade students with an average class size of twenty students were created.

Intervention Intensity: Students used Ascend between 100 and 150 minutes per week.

Progress Monitoring/Data-Based Decision Making Process:

- Intervention leader reviews current status of student achievement and identifies individual needs daily. Intervention leader meets with students biweekly to review dashboard reports and identify additional interventions needed based on objectives.
- Intervention leader collaborates with other math teachers implementing the program several times a week.
- Intervention leader collaborates with general instruction math teachers throughout the quarterto discuss progress and review intervention impact.
- Students that remain stagnant on a particular grade level receive additional small-group instruction, peer collaboration, or one-to-one instruction.
- Students self-assess during each month by creating a SMART goals data sheet.

Responsiveness to Intervention: Intervention Period: 1 Quarter

Level	Grade 6 Pre		Grade 6 Post		% Change
3	40	78%	6	11%	- 85%
4	6	12%	40	73%	+ 567%
5	4	8%	8	15%	+ 100%
6	1	2%	1	2%	0
7	0	0%	0	0%	0
8	0	0%	0	0%	0
TOTAL	51		55		

Level	Grade 7 Pre		Grade 7 Post		% Change
3	54	67%	4	4%	- 83%
4	15	19%	50	51%	+ 149%
5	5	6%	19	19%	+ 270%
6	2	2%	2	2%	0
7	5	6%	5	5%	0
8	0	0%	0	0%	0
TOTAL	81		98		

Level	Grade 8 Pre		Grade 8 Post		% Change
3	30	65%	0	0%	- 100%
4	8	17%	35	74%	+ 338%
5	3	7%	7	15%	+ 133%
6	0	0%	0	0%	0
7	5	11%	5	5%	0
8	0	0%	0	0%	0
TOTAL	46		47		

2. Block Periods

Overview

Students requiring intervention are divided into small groups and rotated through whole group instruction (grade level instruction), Ascend Math (intervention), and independent, paper and pencil practice (combination of homework and Ascend Math study guides).

Intervention Intensity

Intervention period is typically a full school year; students use Ascend Math is used for thirty minutes per day.

Resources Required

Students may be monitored by classroom teachers, intervention specialists, or para-professionals. A three-to-one student-to-computer ratio is required.

Implementation Snapshot: Snowy Peaks High School, Frisco, CO

Number of Students Using Ascend: 36 Number of Teachers Using Ascend: 1

Core Program Goals:

1. Students began school year below grade level in mathematics and were unable to succeed in traditional Algebra and Geometry classes as a result of this deficiency. Ascend Math provided individualization in their math lessons to support specific learning gaps, preparing them to succeed in a more traditional math class.

2. Students were significantly deficient in mathematics credit, with little time to accrue. Ascend allowed them to work at a faster pace, thus giving them the opportunity to earn credits faster than in a typical, traditional math class.

Intervention Intensity: Students used Ascend approximately 4 hours and 10 minutes per week, with additional access at home or at school after hours.

Responsiveness to Intervention:

Intervention Period: 1 Year

- Students advanced between and two and three grade levels within one year.
- Students solidified/gained knowledge and skills in Geometry, translating into successful completion of Algebra II.
- Enabled students to graduate who otherwise would not due to credit deficiency.
- Students taking the NWEA test to measure student achievement in both the fall and winter session grew by an average of 5.7 points in one semester. On the NWEA, a year's worth of growth is estimated at 3 points. Thus, students who were using Ascend Math, demonstrated nearly 2 years of growth within a single semester.

3. Math Labs

Overview

Students use Ascend Math in a computer lab several times per week, and may accommodate small group break outs with teacher.

Intervention Intensity

Intervention period is typically a full school year; students use Ascend Math 30-50 minutes per session, between two and three sessions per week.

Resources Required

Students may be monitored by classroom teacher or computer lab teacher. A one-to-one student-to-computer ratio is required.

Implementation Snapshot: Crisp County Middle School, Cordele, GA

Number of Students Using Ascend: 112 Number of Teachers Using Ascend: 2

Core Program Goals:

1. Meet the needs of middle school students who have consistently failed the Georgia Math CRCT state assessment.
2. Provide students the math remediation instruction needed to be successful in regular math classes and to move successfully into High School Math coursework.
3. Impact the high school dropout rate, which is significantly affected by students' inability to handle high school Algebra requirements.

Intervention Intensity: Students used Ascend between three and four hours per week.

Responsiveness to Intervention:

Intervention Period: 1 School Year

- Of the students using Ascend, 41% completed two or more levels. Forty-five students attained their goal grade level within one year.

- CRCT Passing Rates

Grade Level	% Passed Math CRCT Pre	% Passed Math CRCT Post	Increase
6	25%	62%	37%
7	10%	83%	73%
8	0%	42%	42%