



Response to Intervention

An Alignment Guide for *FASTT Math*



Tom Snyder Productions, Inc., a Scholastic company, has prepared this Alignment Guide to assist Local Education Agencies (LEAs) and schools that are currently implementing or are considering adopting a *Response to Intervention (RTI)* approach. This guide provides key background information on current educational policy related to *RTI*, and demonstrates how *FASTT Math* can complement and strengthen the implementation of *RTI* and ultimately raise student achievement. This Alignment Guide provides the following information:

- *Response to Intervention* Overview
- *FASTT Math* Overview
- Alignment of *FASTT Math* to *RTI* Core Components

FASTT Math is a research-based math intervention program designed to support students in 2nd grade and up in establishing fact fluency in addition, subtraction, multiplication, and division in order to develop higher-order math skills. *FASTT Math*:

- Automatically differentiates instruction in customized daily sessions based on continuous assessments of students' math fact fluency.
- Supplies a range of software-generated and interview-based assessments and software-generated reports used to monitor students' progress and adjust instruction.
- Offers a series of professional development resources and supplementary materials that focus on tailoring instruction to meet all students' varied needs.

Using the Alignment Guide

Since January 2006, districts are permitted to use up to 15 percent of their *Individuals with Disabilities Education Act (IDEA)* funds for interventions and measurements to be used within the *RTI* framework. This Alignment Guide addresses how *FASTT Math* supports the implementation of *RTI*. For questions regarding Response to Intervention services, please consult the final IDEA, Part B regulations governing the Assistance to States for Education of Children with Disabilities Program and the Preschool Grants for Children with Disabilities Program. They can be found at <http://idea.ed.gov/explore/home>.

The Alignment Guide is informed by the *IDEA* 2004 Regulations, the National Association of State Directors of Education (NASDSE) 2005 Report, guidelines provided from the Vaughn Gross Center for Reading and Language Arts at the University of Texas at Austin, and consultation with Dr. Joe Witt, author of the iSTEEP model on the core principles and practical implementation of *RTI* in schools.

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About Tom Snyder Productions

Tom Snyder Productions, Inc., a Scholastic company, is a leading developer and publisher of educational software for K-12 classrooms. The company was founded over 25 years ago by Tom Snyder, a former science and music teacher who pioneered the utilization of technology in the classroom to improve student understanding and performance. Today, Tom Snyder Productions has received over 150 prestigious industry awards and is used in over 400,000 classrooms. The company’s software titles cover each curriculum area, and its professional development team has helped more than 175,000 teachers learn to integrate technology effectively into their curricula. (www.tomsnyder.com)

Response to Intervention (RTI) Overview

Background

The reauthorization of the Individual with Disabilities Education Act (*IDEA* 2004) changed the way students are evaluated for special services by encouraging schools to use research-based interventions to address diverse students' needs early on.

What is RTI?

Response to Intervention (RTI) is not a particular program, curriculum, or model. Rather, it is a framework for allocating instructional services that are aligned to students' individual needs. It aims to prevent unnecessary assignments to special education through the provision of tiers of intervention and continuous progress monitoring.

RTI includes:

- Providing tiers of increasingly intensive, research-based intervention matched to students needs
- Measuring and continually monitoring students' progress over time
- Using resulting data to drive educational decision-making

The purpose of *RTI* is:

- To focus on prevention and early identification of students in need of special services
- To better integrate services between the general and special education population

The Multitiered Intervention Model

RTI uses a multitiered model of service delivery to promote efficient response to students' needs. Each tier provides increasingly intense support structures to ensure that students succeed.

Tier 1: Core Instructional Interventions

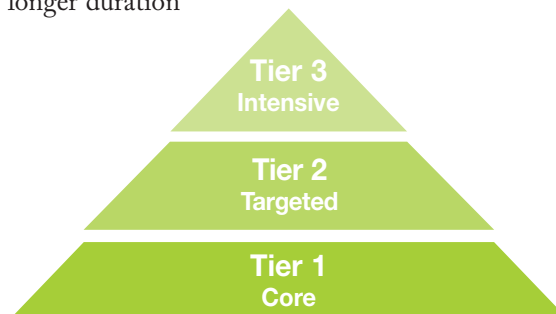
- General curricula for all students
- Proactive interventions based on instructional variables within whole-group instruction

Tier 2: Targeted Group Interventions

- Supplemental instruction for students who are not successful in Tier 1
- Targeted interventions oriented towards small-group instruction
- Explicit instruction, rapid response

Tier 3: Intensive, Individual Interventions

- Individualized instruction for students who are not successful in Tier 2
- Intensive interventions oriented towards individual students
- Diagnostic assessments to determine student need
- Higher intensity, longer duration



Core Components of RTI

1. A Multitiered Intervention Model

Multiple tiers of intervention allow schools to offer increasingly intense interventions to those students who are not making adequate progress in the core curriculum (Tier 1). Interventions in Tiers 2 and 3 may be intensified by increasing instructional time, decreasing group size, using materials matched to students' instructional levels, modifying modes of presentation, and providing regular corrective feedback.

2. Universal Screening

All students should be screened three times a year to identify those students who are not making expected academic progress. Screening measures should be brief, reliable, valid, and appropriately identify those students who require more intense interventions.

3. Scientifically Validated and Research-Based Interventions

IDEA 2004 and *No Child Left Behind (NCLB)* require that interventions be research-based. Interventions should be based on research-based practices and validated by scientific studies.

4. Frequent Monitoring of Student Progress

The progress of students receiving interventions must be monitored frequently in order to determine whether the interventions are producing the desired academic gains. The progress monitoring measures should be brief, target specific skills, be administered easily, and accompanied by decisions to inform instruction.

5. Data-based Decision Making

In all tiers of intervention, data from screening and progress monitoring measures should be used to make educational decisions for individual students.

6. Supplemental Instructional Materials

The use of supplemental materials, where appropriate, strengthens the efficacy of the comprehensive core curriculum and supports student learning in Tier 1.

7. Professional Development

A high-quality professional development plan should be used to support teachers implementing *RTI*. The plan should allow for coaching, e-learning courses, and other opportunities.

8. Coordinated Funding

Components of *RTI* funded by *IDEA* may be coordinated with activities funded by, and carried out under, the Elementary and Secondary Education Act (ESEA).

FASTT Math Overview

FASTT Math is an intervention program designed to support students in 2nd grade and up in establishing fluency with basic math facts from numbers 0-9 or 0-12. With interactive software, comprehensive teacher resources, and individualized practice sheets, students gain automatic recall of basic addition, subtraction, multiplication, and division facts, allowing them to free up critical mental resources so that they can focus on higher-order math. With the research-validated *FASTT* system (Fluency and Automaticity through Systematic Teaching with Technology), computer-based instruction is automatically differentiated in customized daily sessions based on continuous assessments of students' fluency.

The goal of *FASTT Math* is to support students in developing the ability to retrieve basic math facts from memory, accurately and fluently. Educators and cognitive scientists agree that the ability to recall basic math facts fluently is necessary for students to attain higher-order math skills. Through an adaptive program of systematic instruction and practice, *FASTT Math* helps students to abandon the use of inefficient strategies for determining the answers to basic facts, such as finger counting, and helps them develop the capacity to retrieve the basic facts from memory quickly and effortlessly. Without fluency, these basic computations become effortful, slow, and error-prone. In fact, studies have shown that a lack of automatic math fact retrieval presents obstacles in attaining higher-order math skills (Resnick, 1983) participating in math class discussions (Woodward & Baxter, 1997), engaging in math problem solving (Pellegrino & Goldman, 1987), and even developing everyday life skills (Loveless, 2003).

FASTT Math employs a proven approach called “expanding recall” to help students move newly acquired math facts from their working to their long-term memory. No more than three new facts are introduced during any given 10-minute session to avoid cognitive overload. Placement and diagnostic assessments, adaptive instruction, independent practices, continuous progress monitoring, and actionable reports work together to meet each learner precisely where he or she is. For students who do not possess a conceptual understanding of the operations, the program offers additional lessons and activities that focus on the mathematical foundations they need before developing fluency. Years of research have demonstrated the *FASTT Math* system to be effective with struggling and non-struggling students.

***FASTT Math* Aligns to Response to Intervention Core Components**

The following information outlines how *FASTT Math* addresses the Core Components of a *Response to Intervention (RTI)* Model.

RTI 1

A multitiered intervention model with intensity of services increasing as students move up the tiers.

FASTT Math has the capacity to support all diverse learners who require any one of the three tiers of service delivery – Tier 1, Tier 2, or Tier 3. The program can be used flexibly by educators within a variety of instructional models that address all three of the tiers.

In Tier 1, students are to receive core instructional interventions that are preventive and proactive. These interventions are designed to ensure that students continue to perform at or above grade level and do not fall behind. *FASTT Math* can be used to supplement to classroom instruction and provide students with extra practice on any of the four basic math operations that they are learning in class.

Tier 2 is characterized by targeted group interventions for students who are considered to be at-risk and about a year below grade-level. Students who do not respond to the core instructional interventions in Tier 1 receive Tier 2 interventions. *FASTT Math* serves as an appropriate Tier 2 intervention for those students who lack the math fact fluency skills that peers mastered in earlier grades. A teacher can select a precursor operation or any of the four operations that a student is expected to have already learned. For example, students who have not mastered addition fluency by the fourth grade can receive intervention in *FASTT Math* on addition while other mathematical concepts are being taught in the classroom.

Tier 3 students are typically individual students who have not responded to the instruction provided in Tiers 1 and/or 2 and are usually two or more years below grade-level. For Tier 3 students, *FASTT Math* includes a special resource to help these students build the deeper conceptual understanding necessary to attain fact fluency. The *Fact Fluency Foundations Guide* includes diagnostic assessments that reveal which of the following three related interventions a student needs—quantity concepts, the counting system, or number-fact linking.

FASTT Math supports differentiated instruction and addresses diverse students' unique learning needs by providing the following:

- **Adaptive Technology**—The *FASTT Math* software adapts daily instruction according to an individual student's performance. Results from the Placement Assessment are used to build an individualized Fact Grid that highlights the student's fluent and non-fluent facts and selects facts for instruction. The program keeps making adjustments so that each student receives the targeted instruction and practice they need to gain automatic recall for all of the facts.

- **Individualized Practice**—Students receive multiple opportunities to practice retrieval of math facts. Several engaging games that become increasingly challenging as students improve provide a platform for improving speed and accuracy with facts they have already learned. In addition, Independent Practice sheets provide students with the opportunity to transfer learning from the computer to pencil and paper. These worksheets are customized to draw on student’s current fact fluency and can incorporate multi-digit and multi-operation computations.
- **Alerts**—The *FASTT Math* program generates alerts to help teachers manage student use of the program. Alerts indicate performance issues such as slow progress or inconsistent usage and automatically generate reports so that teachers can immediately provide targeted support.
- **Additional Interventions**—The *Fact Fluency Foundations Guide* offers concrete guidelines for further assessing and addressing the needs of students who lack the an understanding of the underlying concepts of number counting, quantity, and linking new facts to known facts. Before students engage in fact fluency, they may require one or more of the targeted interventions that address the mathematical foundations underpinning the basic operations.

Additional features that support diverse learners’ needs include:

- The 1.25-seconds monitored response time limit can be lengthened for students with processing difficulties.
- The number of problems presented during instruction can be reduced for students who need more time to absorb new information.
- The audio function can be turned on or off.
- Instructions can be repeated as often as needed.
- Problems can be spoken aloud in English or Spanish.
- The high-contrast for screen text option benefits visually impaired students.

RTI 2**Universal screening measures that are brief, reliable, valid, and appropriately identify students for Tier 2 intervention**

FASTT Math presents opportunities for teachers to identify whether students are in need of additional intervention and continually assess where they are and how they are progressing.

The *FASTT Math* Placement Assessment on the software evaluates which facts in the assigned operation the student can answer accurately and quickly, and which they still need to learn. The assessment adjusts according to how each student is performing. It is designed to give students a chance to answer as many facts as they can without frustrating students who are not performing well. The results reveal exactly the targeted instruction each individual student requires to achieve fact fluency. Educators can compare results with state or district grade-level expectations to see which students are on track and which are at risk of falling behind. The Placement Assessment also alerts teachers as to which students require prerequisite work before they begin the program. Teachers can then use the lessons included in the *Fact Fluency Foundations Guide* to ensure that students gain an understanding the foundations underlying the operations.

A Math Fact Diagnostic Assessment is included in the *Fact Fluency Foundations Guide*. This one-on-one, interview-based assessment helps teachers to further evaluate whether gaps exist in a student's number knowledge, counting, and operations that could be preventing him or her from building automaticity and fluency with basic number facts.

RTI 3 Scientifically validated and research-based interventions

Dr. Ted Hasselbring, professor in the Department of Special Education at the Peabody College of Vanderbilt University and former William T. Bryan Professor and Endowed Chair in Special Education Technology at the University of Kentucky and Laura Goin, Chief Executive Officer of Designs for Learning, developed *FASTT Math* for students in need of assistance with developing fact fluency, based on two decades of research. Dr. Hasselbring has an extensive background designing technology programs aimed at helping students with learning disabilities and those who have been identified as at-risk.

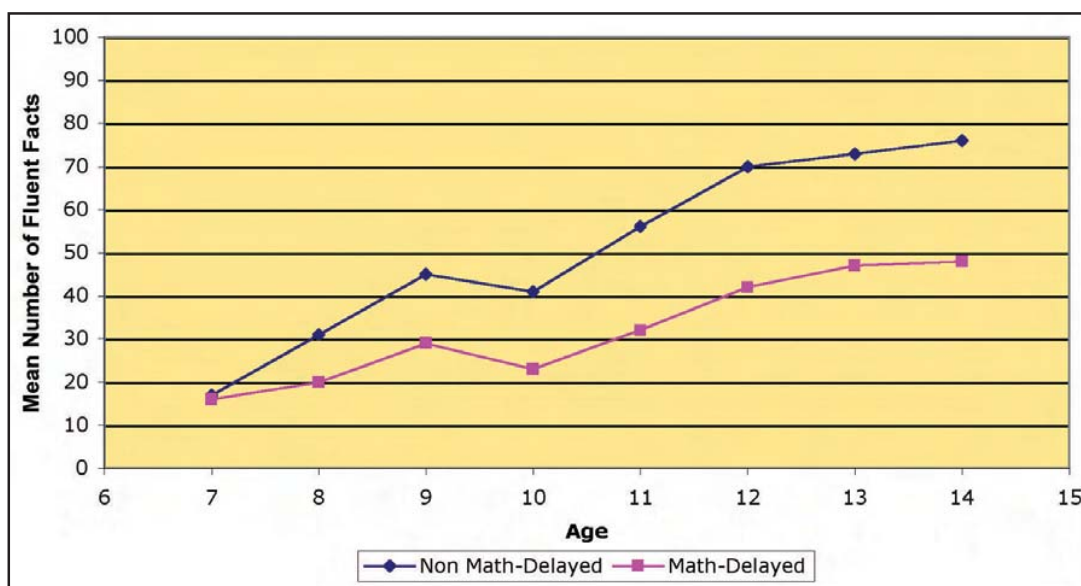
Research reveals that having basic skills is a necessary prerequisite to the development of higher-level functioning in both reading and math (LaBerge and Samuels, 1974, Lesgold, 1983, and Torgesen, 1984). Several studies have shown that a lack of fluent math fact retrieval impedes students from attaining higher-order math skills (Resnick, 1983) participating in math class discussions (Woodward & Baxter, 1997), engaging in math problem solving (Pellegrino & Goldman, 1987), and even developing everyday life skills (Loveless, 2003). Conversely, rapid math fact retrieval has been shown to be a strong predictor of performance on mathematics achievement tests (Royer, Tronsky, Chan, Jackson, & Marchant, 1999). Moreover, brain research in cognitive science has revealed an actual shift in brain activation patterns once automatic retrieval is established (Dehaene, 1999).

The *FASTT Math* approach has been validated over several years of research with both struggling and non-struggling students. Studies involving more than 400 students have demonstrated that the *FASTT Math* approach can be extremely powerful for developing fluency with basic math facts. Students who used the program regularly did better than students who were only occasional users.

An Alignment Guide for *FASTT Math*

In a study conducted by Hasselbring and Goin (1988), the math-delayed students who received *FASTT Math* gained 19 new fluent facts while their math-delayed peers gained only seven new facts. In fact, growth of those who received the intervention increased by more than 70 percent. The research also demonstrated the program’s effectiveness for students labeled at-risk or learning disabled.

Number of Fluent Facts (Addition)



Literature on the research, development, and evaluation of *FASTT Math* include:

- Hasselbring, T.S., Goin, L., & Bransford, J.D. (1988). Developing math automaticity in learning handicapped children: The role of computerized drill and practice. *Focus on Exceptional Children* 20, 1-7.
- Hasselbring, T.S., Goin, L., & Sherwood, R.D. (1986). “The effects of computer-based drill and practice on automaticity.” Technical report. Nashville, TN: Vanderbilt University, Learning Technology Center.
- Research Foundation & Evidence of Effectiveness for *FASTT Math* (2005). New York: Scholastic, Inc.

RTI 4

Use of frequent and brief progress monitoring assessments with decision rules that inform instruction

Continuous progress monitoring is necessary to determine whether the interventions being implemented are working, and support teachers in differentiating instruction. *FASTT Math* includes several periodic assessments that check student progress continuously and adjust instruction accordingly.

- Mastery Assessments determine if a student has developed fluency with the group of math facts presented in the software. Students participate in these assessments depending on how many facts they need to master, and how much time they have spent on the software and the lessons they have completed. After every 60 minutes of instructional time spent on the software, this tool determines which Focus Facts students can retrieve in .8 of a second or less.
- Challenge Assessments show whether the student is able to respond fluently to facts that will be presented in the next level. Students may have been tested on these same facts in the Placement Assessment. The Challenge Assessments account for what the student may have learned and the fact fluency they may have gained outside of using the software.
- The Special Challenge Assessment is presented when a student moves from the 0-9 to the 0-12 number range within the same operation. The purpose is to evaluate fluency of newly assigned facts in the 10s, 11s, and 12s.

RTI 5 Data-based Decision Making

FASTT Math supplies a series of reports that present regular information on individual student performance, overall class or group performance, and software usage. Data from the periodic assessments housed on the software are fed into the Student Achievement Management System (SAM). With SAM, teachers can continuously monitor and assess learning gains for every student, and generate detailed reports. Teachers can then use the data from the reports to inform and target their instruction in order to meet all of their students' diverse needs.

The reports include:

- Student Fact Fluency Status Report shows an individual student's fluency with each fact in the specific operation for a selected date. After a student completes the Placement Assessment, the report provides a baseline of each student's Fast, Focus, and Study Facts. Use of the report on a weekly basis offers ongoing information about each individual student's performance.
- Student Lesson Status Report presents individual student daily lesson status during a selected period of time. It shows how students performed on each lesson, and can be used on a monthly basis to monitor individual student progress, and identify flagged lessons and patterns in fluency development.
- Student Response to Intervention Report provides information about the growth of individual student fact fluency over time. It can be used on a monthly basis to assess a student's response to the intervention and evaluate progress. It also shows teachers whether they need to provide additional support.
- Progress Report summarizes student performance data for a class or group of students. It shows students' performance on Fast, Focus, and Study Facts, as well as usage information for each student. It can be used monthly to determine if students are mastering the information and progressing through the program.
- Intervention Grouping Report groups students under four *FASTT Math* performance standards: Fluent, Near Fluent, Developing, and Underperforming. Flexible grouping based on student performance supports teachers in differentiating and targeting instruction according to students' varied needs.

reports continued on following page

Response to Intervention

- Summary Progress Report offers enrollment information, including the number of students participating in *FAST Math* and the number assigned to each operation.
- *FAST Math* Implementation Report summarizes student fact fluency growth over a selected period of time. It can be used annually to track the frequency of use and assess the overall progress of a class or group of students.

Summary Progress Report
SCHOOL: ROMEO ELEMENTARY
PROGRESS MONITORING
Time Period: 01/08/07 - 05/27/07

TEACHER	ASSIGNED STUDENTS	FLUENT STUDENTS
Courtney McGrath	59	68%
David Seif	71	35%
Wanda Knies	81	77%
TOTAL	211	60%

Student Fact Fluency Status Report
STUDENT: HOLLAND, KAYLA
SCHOOL: ROMEO ELEMENTARY
Teacher: Courtney McGrath
Grade: 5
Class: Math Class
Time Period: 06/27/07 - 09/27/07
Date Started Operation: 05/24/07

Multiplication (0-9)

0x0	0x1	0x2	0x3	0x4	0x5	0x6	0x7	0x8	0x9
1x0	1x1	1x2	1x3	1x4	1x5	1x6	1x7	1x8	1x9
2x0	2x1	2x2	2x3	2x4	2x5	2x6	2x7	2x8	2x9
3x0	3x1	3x2	3x3	3x4	3x5	3x6	3x7	3x8	3x9
4x0	4x1	4x2	4x3	4x4	4x5	4x6	4x7	4x8	4x9
5x0	5x1	5x2	5x3	5x4	5x5	5x6	5x7	5x8	5x9
6x0	6x1	6x2	6x3	6x4	6x5	6x6	6x7	6x8	6x9
7x0	7x1	7x2	7x3	7x4	7x5	7x6	7x7	7x8	7x9
8x0	8x1	8x2	8x3	8x4	8x5	8x6	8x7	8x8	8x9
9x0	9x1	9x2	9x3	9x4	9x5	9x6	9x7	9x8	9x9
0s	1s	2s	3s	4s	5s	6s	7s	8s	9s
Level 1	Level 2			Level 3		Level 4			

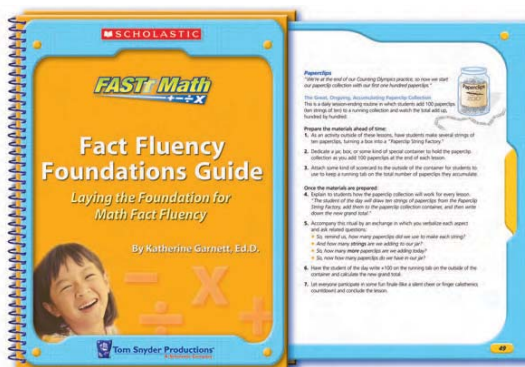
Using This Report
Purpose: This report shows individual student's fluency with each fact in the specific operation for the selected date.
Follow-Up: Share with the student to encourage enthusiasm about progress in fact fluency. If needed, reinforce fact fluency by providing additional practice on Fast Facts and Focus Facts using flashcards and/or fact games.

RTI 6

Supplemental instructional materials, where appropriate, to strengthen the efficacy of a comprehensive core curriculum and support student learning

FASTT Math provides supplemental resources that complement the software instruction. These include:

- **Individualized practice sheets** provide single- and/or multi-digit math equations in any of the four operations or any combination of them, in a horizontal or vertical format. The independent practice sheets provide students with the opportunity to transfer learning from the computer to pencil and paper, and engage in solving more complex computations.
- **Software games** that are intelligent and fun, and become more challenging as students reinforce what they learn in the adaptive instruction part of the program. Students are to play one or two of the games each time they use the program.
- The **Fact Fluency Foundations Guide** offers concrete guidelines for further assessing and addressing the needs of students who lack an understanding of the underlying concepts of number counting, quantity, and linking new facts to known facts. Before a student can develop fact fluency, they may need to receive targeted interventions, which address the mathematical foundations underpinning the basic operations. The following interventions are for students who need additional instruction in one of the three areas:
 - **Quantity Concepts:** Proficiency in this area means that students possess a robust understanding of quantities and quantity relationships. Students should have this proficiency before using the *FASTT Math* software.
 - **The Counting System:** Proficiency in this area means that students possess nimble counting skills for navigating the base-ten number system. Students should have this proficiency before using the *FASTT Math* software.
 - **Number-Fact Linking:** Proficiency in this area means that students are capable of readily linking basic number facts into an efficient mental network. Students can develop this proficiency while using the *FASTT Math* software.



Fact Fluency Foundations Guide written by Dr. Kate Garnett, Ed.D., of Hunter College

RTI 7

A strong professional development plan to support teachers implementing RTI

FASTT Math presents a customizable training and professional development plan to ensure effectiveness of the program. It includes:

Implementation Trainings that teach teachers how to:

- Assess student's progress using *FASTT Math* and the program's management system (Scholastic Achievement Manager).
- Implement *FASTT Math* effectively to provide instruction and practice on a daily basis.
- Integrate *FASTT Math* into existing mathematics curriculum.

Administrator Trainings that teach school and district leaders how to:

- Monitor and assess fidelity of *FASTT Math* implementation.
- Monitor and communicate student progress within the school, district, and home.
- Modify program use as needed based on student outcomes and teacher knowledge.
- Support teachers who are using *FASTT Math*.

The program also presents a variety of professional development solutions, which include teacher guides, workshops, and professional papers. They are:

- *FASTT Math* Teacher's Guide provides strategies for effectively implementing the program and using the software-generated reports to monitor and manage student progress.
- *Fact Fluency Foundation's Guide* offers concrete guidelines for assessing and addressing students' needs in understanding number sense and operations.
- *Fact Fluency: The Phonics of Mathematics* features program author Dr. Ted Hasselbring in a one-hour video presentation.
- *Research Foundation & Evidence of Effectiveness for FASTT Math* presents the research-based principles behind the program and data that shows how effective *FASTT Math* is in increasing math fact fluency.

RTI 8 **IDEA RTI funding in coordination with activities funded by, and carried out under, the ESEA**

FASTT Math can be integrated with funds from states, local districts, private foundations, and other sources. The federal funding programs for which it qualifies includes:

- Title I, Part A—Improving Basic Programs
- Title I, Part A—Supplemental Educational Services
- Title V, Part A—Innovative Programs
- 21st Century Community Learning Centers
- Enhancing Education Through Technology

Summary

FASTT Math strengthens and complements the implementation of *RTI* in schools. The program provides a research-based intervention that proactively improves young students' access to the core curriculum by supporting the development of fact fluency for all students (Tier 1), differentiating and targeting intervention for groups of students who need additional support (Tier 2), and providing diagnostic assessments and targeted interventions for individual students who have not yet acquired a foundational understanding of the mathematical operations (Tier 3).

The *FASTT Math* system delivers individualized instruction and targeted practices that address the diverse needs of all students. With adaptive technology, independent practices, and the additional interventions included in the *Fact Fluency Foundations Guide*, the gaps in each student's number knowledge are identified and filled. Moreover, the assessments and reports embedded in the program promote the practices of screening students, identifying those who require support in developing fact fluency and providing the exact instruction that each one needs, offering ongoing progress monitoring, and producing actionable reports. Finally, the inclusion of professional development resources and supplementary materials further assist practitioners to use the program effectively to meet the goals of *RTI*.

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