



ST Math[®] The ST Math Theory of Change

How does student time and energy invested in ST Math result in schoolwide math proficiency gains? When students solve their way through the puzzle-based games, they self-pace through their grade-level math content and master mathematical concepts. Each ST Math learning objective completed aligns with state math standards, and each additional standard covered gives ST Math students a proven advantage on standardized assessments.

WEEKLY MINUTES

Logging into ST Math at least **2 days per week** throughout the school year, students in schools with the greatest results play **60 minutes per week** of active time on ST Math in grades K-1, and **90 minutes per week** in grades 2-8.



LEARNING

Every time a student poses their solution, the puzzle animates to provide them immediate, **informative feedback** as to why their solution either did or did not solve that puzzle. In addition to learning individual math concepts, ST Math helps students **build robust conceptual frameworks** (or schemas) representing the numerous and interconnected relationships between mathematical ideas, patterns, and procedures. This means students aren't just practicing and memorizing, they are understanding.



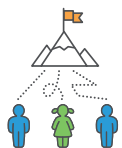
MATH CONTENT COVERAGE

ST Math content is grouped into standards-aligned learning objectives per grade level. Each learning objective covers specific math concepts and standards, and is comprised of games and levels. Each level is comprised of a set number of puzzles, which pose mathematical situations (problems) visually for students to solve. **The more learning objectives students complete, the more standards that are covered.**



SUMMATIVE TEST ADVANTAGE

As students win their way towards covering the majority of grade-level math content in ST Math, on average they **increase their summative test scale scores.**



STUDENT PRODUCTIVE STRUGGLE

Through its visual, spatial-temporal approach and scaffolded design, ST Math pushes all students (EL, Special Education, Gifted) to productively struggle. **Productive struggle** is a state of engagement that enables students to work through increasingly challenging problems and non-routine problems they have never seen before, and is proven to lead to deeper conceptual understanding.



MASTERY BASED PROGRESSION

Like in a video game, students must pass each level with a **score of 100%** (all puzzles correctly solved) before the next level in sequence becomes available to them. Self-pacing allows students to replay a level with new sets of puzzles on their personalized path to mastery.



TEST ITEM SUCCESS

As students progress and master learning objective content, ST Math **quiz results show improvements in test item success on the math standards covered** by each learning objective.



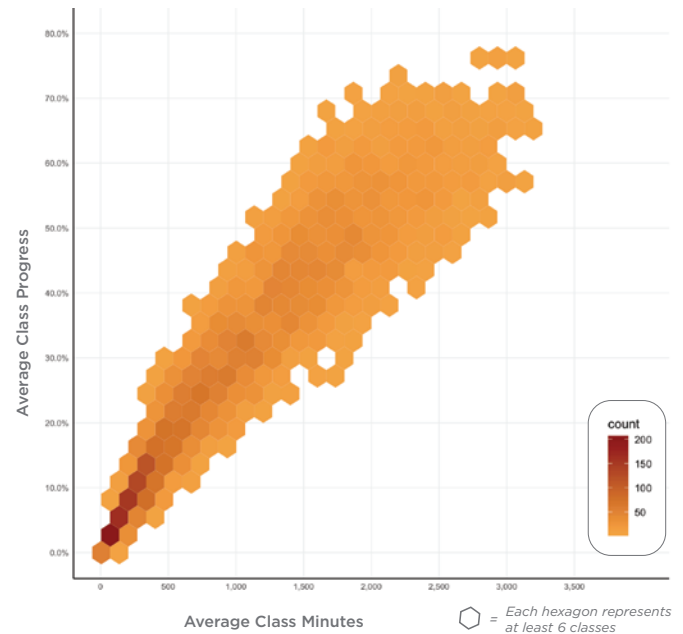


Minutes Toward Mastery—Committing to Success

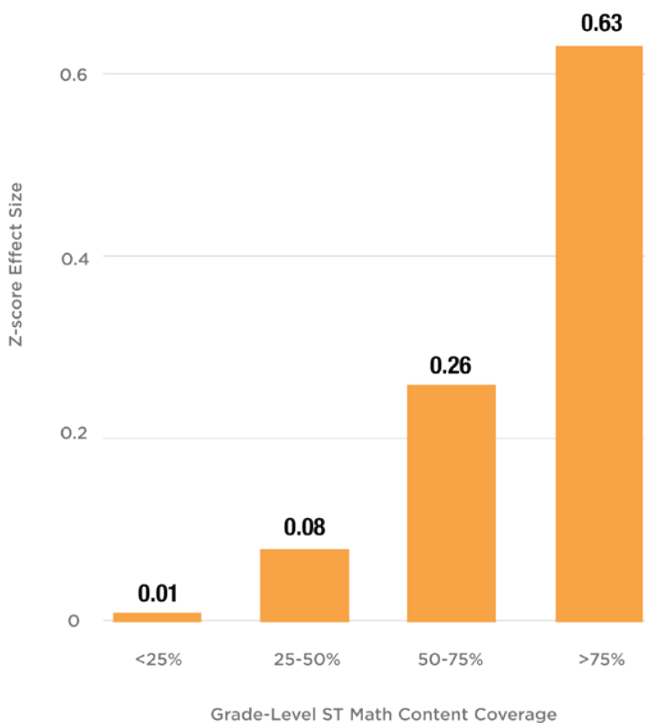
Achieving Progress Requires Minutes

According to our research, the minimum level of implementation (60 minutes per week for kindergarten and grade 1 classes, and 90 minutes per week for grades 2-8) should result in schools progressing through sufficient grade level content and associated math standards within the year to see a significant boost to schoolwide test scores, compared to similar schools without ST Math. The program is self-paced, and some students will require more time than others to master the content and achieve high rates of content completion. Covering more content simply requires more time on ST Math, but leads to even greater gains in student achievement.

Average Progress vs. Average Yearly Minutes per Class
2018-2019 3rd Grade Classes



State Test Effect Size by Content Coverage



Higher Content Coverage Increases Math Performance

A 2017/18 study matched 3,102 ST Math-using grades with non-ST Math grades that were similar on math performance and demographics. Sub studies were performed to evaluate the effect of the amount of ST Math content covered. Growth in gradewide math proficiency was compared for the ST Math group versus the comparison group, and effect sizes were evaluated. The results were clear—completing more of the ST Math program content led to dramatically higher results for student proficiency.

All students can master and complete the entire ST Math program, given sufficient time. Create an implementation plan for your school that maximizes minutes spent on ST Math, and you will see the results.

