# Spring Math FAQs

**How does Spring Math work?**

The Spring Math process:

- assess students' current skill level (takes less than five-minutes and are group administered)
- summarizes the results in an easy-to-read format
- provides intervention recommendations

There are two types of interventions in Spring Math: classwide and individual.

- Classwide interventions provide weekly adjustment of skill difficulty, new materials each week, summary reports reflecting classwide progress, and implementation support to promote sustained use of the intervention.
- Individual interventions begin with a “drill-down” assessment process to identify the right intervention for the student.

For both intervention types, Spring Math guides the teacher step-by-step. All intervention packets are dynamically generated as they are needed to ensure they match current skill development. Spring Math's proprietary decision rules direct instructional decisions, speeding up student growth.

Spring Math helps educators avoid two of the most common causes of intervention failure: choosing the wrong intervention and failing to use the intervention.*

Spring Math simplifies intervention delivery by:

- minimizing alternative causes of low mathematics performance
- using assessment data to select the right intervention for the child
- delivering to the teacher all needed materials to conduct the intervention in just 15-20 minutes per day

Spring Math theory of change infographic (PDF)

**Data from a randomized controlled pilot study showed that Spring Math-directed intervention produced stronger alignment with student need, increased teacher use of the intervention, and improved student learning in mathematics.*

**How are the screening skills selected?**

Screening skills are skills that students should have been introduced to before the screening. They are skills that students will need to master before learning the next skills appropriate for their grade.

At each grade level, for fall, winter, and spring, there are three to five screening assessments. The assessments emphasize some skills more than others. These are called “tool” skills. Tool skills open the door to deeper understanding of big ideas in mathematics. Spring Math selects tool skills based on the latest research in effective math instruction.

All screening skills align with the Common Core State Standards by grade level. For some grades Spring Math provides screening and instruction on skills not listed in the Common Core. These are skills that pave the way for a Common Core skill that appears in a later grade.

Spring Math Screening by Grades and Time of Year (PDF)

**Why are the assessments timed?**

The assessments are timed to minimize the amount of time devoted to assessment. Spring Math uses short, curriculum-based assessments to reliably and accurately determine if a student is at risk.

Spring Math uses the shortest interval of time that provides the best measure of student proficiency. Once at-risk students are identified, they are then given a series of brief follow-up assessments. These determine where the problems are to make the right intervention recommendation. Recent research shows this more efficient approach to screening performs as well as or better than longer duration methods.

Timed assessments also provide a more accurate indicator of skill mastery.

Example:
Imagine two students: the first student scores 100% correct and responds quickly, without hesitation. She can solve a problem multiple ways and can teach a friend how to solve the problem. The second student also scores 100%, but she is halting, unsure, and must count hash-marks to find the correct answer. Clearly the first student is more proficient even though both students have the same score on an untimed assessment. Timed assessments tell teachers more about student proficiency, as those students who are more proficient will answer more problems correctly within the time limit.

**How are Spring Math assessments different from other math assessment tools?**

Spring Math's unique, gated approach to math assessment saves teachers time by providing clear results on what skills a student has and hasn't acquired. Spring Math provides the speed of curriculum-based measurement as well as the sensitivity to growth of specific-skill mastery assessment.

Spring Math assesses approximately 130 skills for core instruction in grades K-8 and remedies gaps in learning for grades K-12. The skills offer comprehensive but strategic coverage of the Common Core State Standards.

Spring Math assesses mastery of number operations, pre-algebraic thinking, and mathematical logic. It also measures understanding of "tool skills." Tool skills provide the foundation a child needs to question, speculate, reason, solve, and explain real-world problems. This approach is unique in math assessment tools and emphasized in Spring Math with grade-appropriate techniques and materials.

These tool skills include:

- combining whole numbers and variables
- taking whole numbers and variables

- multiplicative reasoning including factors, products, and exponents
- fractions, proportions, and division
- quantity comparison, ordinal position, and place value
- solving for unknowns
- and creating equivalent quantities

Many of the intervention materials in Spring Math provide an opportunity for mastering more than one tool skill.

View a list of tool skills assessed (PDF)

**How does Spring Math determine if a student is at risk?**

Spring Math decision rules come from 40 years of research in math teaching and curriculum-based measurement, and are designed to increase alignment between student proficiency, skills, and teaching methods.

If a student scores in the risk range on a Spring Math measure it means the student is unlikely to retain the skill or be able to use it to solve similar and more complex problems. At-risk students are likely to make errors when solving problems requiring use of the skill and the child is not likely to master future related and more complex skills.

**Why are assessments given as part of the interventions?**

Research shows that regular skill assessment is an important part of effective math instruction. Current screening tools don't recommend interventions based on student assessment scores. Likewise, online math skill tools give students practice but don't provide real feedback on skill mastery.

Spring Math provides both, by using weekly assessment scores to recommend the right intervention for each student. And Spring Math's intervention materials are dynamically generated to make sure students are practicing the right skills each day.

It can be challenging and time consuming to perform high-quality assessments in the classroom on a regular basis. Spring Math makes it easier by providing assessment materials that are relevant to the skills the student is practicing. These materials are also generated dynamically, so they are available right when you need them.

Research results on follow-up assessments to track the effects of skill intervention have been promising. For further information refer to Innovation Configuration for Mathematics (VanDerHeyden & Allsopp, 2014).

**What research evidence supports the use of Spring Math?**

Spring Math benefits from research conducted by Spring Math author, Dr. Amanda VanDerHeyden, but also by respected scholars in both education and psychology. The design of Spring Math — including screening assessments, skill content and sequences of skills, intervention protocols, summary reports, and implementation

support —utilizes the best-available research evidence.

View a list of references to these studies (PDF)

Skill sequences used in assessment and intervention were developed in coordination with content-area experts as part of a wide-scale district trial of Response to Intervention implementation *(VanDerHeyden, Witt & Gilbertson, 2007)*. These skill sequences have been cross-validated against Common Core State Standards with subtle adjustments to ensure fit.

Alignment of Spring Math content and Common Core State Standards (PDF)

The design of intervention features leverages the latest best practices and research evidence, and include:

- aligning intervention tactic and skill difficulty with student proficiency
- decision rules to determine the intervention tactics that produce maximal growth
- sequence of intervention moving from prerequisite to goal skills
- specific intervention tactics including modeling
- guided practice
- immediate versus delayed corrective feedback
- verbal rehearsal strategies and "think aloud" problem solving
- scripted conceptual understanding tactics specific to each skill

A randomized controlled pilot study of Spring Math conducted in the Boston Public Schools examined the effect of Spring Math on intervention skill and strategy alignment, intervention use, and mathematics learning. At-risk students in grades 1-5 (N = 39) were randomly assigned to use Spring Math or a teacher-selected intervention for four weeks. Brief skill assessments were then administered each week following standard curriculum-based measurement procedures to track growth of each group.

Growth was computed as answers correct per two minutes per week on the intervention skill and the generalization skill, and integrity was estimated by permanent product as days per week of intervention use.

The study showed that intervention skill and strategy alignment were superior with Spring Math, with alignment approximating the base rate (or accuracy based upon chance alone) in the teacher-selected interventions. Statistically significant differences were detected on all outcome measures.

View a list of intervention studies (PDF)

**What research was used as the basis for developing the assessments?**

Skill sequences used in assessment and intervention were developed in coordination with content-area experts as part of a wide-scale district trial of RtI implementation (VanDerHeyden, Witt & Gilbertson, 2007). Skill sequences have been cross-validated against Common Core State Standards.

Alignment of Spring Math content and Common Core State Standards (PDF)

- Assessments were built using the science of curriculum-based assessment. Measures were constructed to sample specific skills, yield reliable and valid scores, and to allow for brief, repeated assessment to model progress over time and in response to instructional changes.
- Research has estimated score reliability of computation CBM probes for mathematics from r = .67 to above r = .90 *(Foegen, Jiban, & Deno, 2007)* for alternate form, test-retest, inter-scorer agreement, and internal consistency. Delayed alternate form reliability of the scores obtained on Spring Math measures used in one study was r = .85 *(Burns et al., 2006)*. Criterion validity evidence has been somewhat variable in mathematics CBM with correlation coefficients typically falling in the moderate range (r = .3 to r = .6; Foegen et al., 2007). Scores obtained on the computation CBMs used in one study were found to correlate with Stanford Achievement Test *(Harcourt, 1997)* scores in the moderate range of r = .27 to r = .40 *(VanDerHeyden & Burns, 2008)*.
- For the kindergarten measures, research has found alternate form correlations for the math measures ranged from r = .7 to r = .84 and correlated with the math composite score on the Comprehensive Inventory of Basic Skills, Revised *(CIBS-R; Brigance, 1999) (correlations range from r = .44 to r = .61; VanDerHeyden, Witt, Naquin, & Noell, 2001).*

Usability testing has also been conducted for all the assessments generated within Spring Math to ensure equivalence across measures, meaning that any change in performance from one assessment occasion to the next is due to student growth, not measurement error.