

Boost Student Math Learning with Spaced Practice

Teachers across the country report that students just don't seem to retain the math concepts they were taught in the previous grade or indeed earlier in the current school year. This forces teachers to spend valuable instruction time completely reteaching math material previously covered.

Much of the failure to retain and cement learning is due to the way many elementary math programs organize the introduction of math content. Most math programs rely on a massed learning approach, where students learn and then practice mathematical concepts numerous times during a relatively short period and then move on to new material. Students don't have the opportunity to revisit and practice the old material until they begin prepping for end-of-the-year assessments. The result is that they don't cement what they learned earlier in the year. Just as when you crammed the night before for an exam, you might have passed the test, but you didn't retain what you studied.

Math learning however is dependent on previous learning, students cannot progress to more complex content without a deep understanding and retention of prior concepts. That's why at ORIGO we use a spaced learning approach (also known as spiral review or distributed practice).

Spaced learning—distributing short teaching sessions of a particular skill over time— allows teachers to review previously taught content by extending and applying the concepts to new content. Spaced learning has been shown to help **students learn faster and retain information better**.¹ According to John Hattie's seminal research, spaced teaching and practice has an effect size of .60, which means that students can realize 1.5 years of learning in one school year.

"Not all kids are ready to learn a whole concept at the same rate. Since we started using spaced learning with key concepts broken into smaller chunks, kids have the time and space they need to master that a piece of that concept. Since they have time to process and make sense of smaller pieces of content, they build confidence with critical concepts. And they feel ready to move on when the concept comes back again."

— Grade 5 Teacher, Stafford VA



¹Cepeda, Nicholas J., Harold Pashler, Edward Vul, John To. Wixted, & Doug Rohrer. 2006 "Distributed practice in verbal recall tasks: A review and quantitative synthesis." *Psychological Bulletin* 132 (3):354-380. Doi:10.1037/0033-2909.132.3.354.

Benefits of Spaced Learning versus Massed Learning

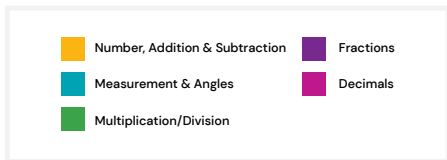
Spaced Learning

- Students build upon previously learned concepts and have a deep mastery of math concepts
- Students create multiple pathways over time to access information, improving recall and retention
- Students more easily make connections between math concepts and topics
- Teachers spend more time teaching new ideas

Massed Learning

- Students do not retain previously learned concepts, resulting in shallow knowledge base
- Students lay down one retrieval method in a short period of time, impeding effective recall of information
- Students struggle to remember prior math concepts, make connections impossible
- Teachers spend more time reteaching previously taught concepts

So, what does a spaced-learning curriculum look like when contrasted to a massed-learning curriculum? Here is a comparison of how units are introduced in 4th grade for a traditional math program using a massed approach vs. Stepping Stones 2.0 which relies on a spaced approach.



At first glance, the spaced approach may look a bit hodge-podge, but extensive research has shown that this approach gives students a deeper understanding of the math underlying the concept and improves retention of complex concepts. As with any new approach, there is a learning curve. And once teachers have tried space learning, they find they have more instructional time, as they are no longer spending time completely reteaching previously-taught units and concepts.

Furthermore, students have a deeper understanding of the material and retain what they have learned because they have had multiple times to practice over a carefully architected, spaced period of time. And, students feel powerful in their math knowledge, able to tackle new concepts confidently.

Research-based evidence is important, but we know you also want to hear from real teachers in real classrooms.



“With a spaced–practice approach, I feel less stressed since I’m able to teach one smaller chunk of what are huge concepts for kids. I can focus my instruction on what my students need. I know that if they are struggling, we have time to solidify these critical ideas between units. So, I feel more successful teaching these big ideas than ever before.”

— **Grade 5 Teacher, Stafford, VA**

“Teachers commented that students ‘haven’t forgotten as much as they usually do’ when they move on to the next section of a particular topic.”

— **Grade 5 Teacher, Stafford, VA**

“I really love teaching with ORIGO I believe that when you teach ORIGO the way the resource was designed, students not only learned strategies for math, but they learn why the strategies work and they just have a deeper understanding for how math works.”

— **Kindergarten Teacher, Grand Island, NE**

“What’s different about Stepping Stones is the intentionality of building in the research into how the program is structured, it provides teachers with an understanding of why they are teaching what they are teaching, where it’s coming from, and where it’s headed. The intentionality of the scope and sequence is also unique and once again provides an understanding of how the program builds from module to module and grade level to grade level.”

— **Assistant Superintendent of Curriculum and Instruction, Plainfield, IL**

In conclusion, spaced learning ensures students attain a deep, and enduring, understanding of foundational math concepts providing them with the ability to master more complex content.

[Learn more](#) about ORIGO’s Stepping Stones 2.0 math curriculum!



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