

## LEARNING, INNOVATION & TECH

BOMBS & BREAKTHROUGHS

### Singapore Math Demystified! Part 4: Bringing Singapore Math To Your School

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*" . . .this deep understanding of elementary math seems to be lacking in many U.S. teachers. I know because I was one of them before I began this journey and I am still learning . . ."*

--Bill Jackson

*ED. Note: Math-phobia is one of the more challenging issues for our students and for this country's educational make-up and there is much to learn from other leading countries such as Singapore.*

*This is the final installment of the 4-part series "[Singapore Math Demystified!](#)" from The Daily Riff, guest posted by Bill Jackson, Math Helping Teacher, Scarsdale, NY Public Schools, one of the highest performing districts in the country, due to the remarkable interest expressed by parents and schools. We are delighted that Bill is sharing his wealth of knowledge, self-initiative and fascinating journey from Japan to Germany, discovering and pursuing Singapore Math.*

Links to all four parts below.

### How To Make Singapore Math Happen In Your School

#### Tips For Implementation

#### Part 4 of 4

By Bill Jackson

I have used Singapore math extensively in two markedly different school environments: an inner city school in Paterson, New Jersey and the affluent suburb of Scarsdale, New York. These experiences, as well as the many public, private, and charter schools I have worked with all over the country, have taught me that all students can learn mathematics in powerful ways through Singapore math. There are three factors, however, that should be considered carefully by schools that are thinking of using Singapore math: (1) students' levels of readiness, (2) teacher preparation, and (3) parental support. I believe that Singapore math can be successful at any school if these three areas are addressed adequately.

#### **Student Readiness**

It is important to consider students' current state of learning when implementing Singapore math. This is because the level of mathematical rigor in Singapore math is higher than in most U.S. math programs. Since fewer topics are taught each year for mastery, previously learned topics are generally seen only in the context of higher level mathematics, not repeated year to year as in typical overstuffed U.S. math textbooks. This focused and concentrated mastery approach allows students to move to increasingly higher-level mathematical content each year.

Although Singapore math textbooks are more rigorous, this rigor is not initially apparent. In first grade, it may seem like Singapore math is actually easier than typical U.S. math programs. This is because most of the time is devoted to building strong number sense - the foundation upon which future mathematical knowledge is built. By around the third grade this increase in rigor begins to become apparent and by fifth grade Singapore math textbooks are approximately one to two years ahead of U.S. math programs. Also, problem-solving strategies such as bar modeling are developed gradually across the grades. So if fourth or fifth grade students who have never had Singapore math before are thrown into the program, they may struggle because they lack the prior knowledge and strategies they need to be successful.

Depending on students' levels of readiness, it may not be wise to implement Singapore math in every grade all at once. One possibility is to implement it in kindergarten through first or second grade the first year and then add one grade level each subsequent year. Another is to give students the previous years' material (e.g. give third grade students the second grade textbook). Since Singapore math is more rigorous anyway and the earlier concepts and strategies are so important, students will not lose out by learning the previous year's content.

That being said, Scarsdale implemented Singapore math in all grades from kindergarten to fifth grade at the appropriate grade levels (e.g. fifth graders using the fifth grade books) for the following reasons. (1) Scarsdale students were already doing well academically. (2) Teachers used Singapore math material from previous grades to supplement and fill in the gaps in students' learning. (3) Some parents may not have been happy knowing their child was using a lower grade textbook. And (4), even with the difficulties and challenges of using Singapore math in the higher grades, the benefits outweighed the drawbacks.

Since student readiness is such an important issue, some people may be wondering if children should be grouped homogeneously according to ability levels. I have seen that this can be effective in some situations (e.g. special education classes). But in most cases I am against ability grouping because I think the heterogeneous classroom is a richer environment for problem-based learning. As students solve problems using different methods from simple to complex and discuss the advantages and disadvantages of their various solution methods, children can learn from each other. This rich and diverse problem-based classroom environment can bring all students to high levels. (To find out more about problem-based lessons, please see [Part Two](#).) Of course this requires training in order for teachers to teach this way effectively.

### ***Teacher Considerations***

Most American elementary teachers have little formal mathematics training in college and [several studies](#) have shown how the level of teachers' mathematical content knowledge affects the learning of their students. This does not mean that teachers necessarily have to understand high-level mathematics such as calculus in order to teach elementary mathematics. **They do have to understand elementary mathematics in depth, however, and this deep understanding of elementary math seems to be lacking in many U.S. teachers.** I know because I was one of them before I began this journey and I am still learning (see [Part One](#) for details).

One important area to focus professional development on then is improving teachers' mathematical content knowledge. Furthermore, teachers need to combine a solid understanding of mathematics with good pedagogy (teaching methods), including knowledge of the methodologies and strategies used in Singapore math. This deep knowledge of both content and teaching necessary to help children understand mathematics well is what educational psychologist [Lee Shulman](#) called [pedagogical content knowledge](#).

In my experience, teachers can acquire the pedagogical content knowledge necessary to teach Singapore math effectively in three ways:

- 1) learning collaboratively from one another,
- 2) learning from knowledgeable others, and
- 3) self-learning.

### ***Learning From One Another***

When I first began using Singapore math in Paterson, NJ in 2000, there were no Singapore math trainers available in the U.S. One of the ways the teachers at our school learned how to improve our practice was through [lesson study](#). In lesson study, teachers collaborate in small groups to study materials, plan a lesson, teach it to students with colleagues observing, and discuss the lesson afterward with the group. Often an outside knowledgeable other such as a university professor, math coach, or supervisor is invited to add final comments and suggestions for further improvement. Japanese teachers have used lesson study for many years to improve their teaching, and it has contributed to the high level of math teaching seen in [Japanese classrooms](#). In Scarsdale, many groups of teachers have gone through the lesson study process and can testify to its effectiveness in improving their teaching and understanding of mathematics.

### ***Learning From Knowledgeable Others***

Another way to help teachers is through the support of knowledgeable others such as university mathematicians or math educators, school-based or district-wide math coaches or support staff, and [Singapore math trainers](#). In Scarsdale, I am one of three full-time "Math Helping Teachers" working with classroom teachers in five elementary schools to conduct workshops, meet together to plan and study mathematical content, teach demonstration lessons, and conduct lesson study. We have also brought in experts such as [Banhar Yeap](#), [Makoto Yoshida](#) and [Catherine Lewis](#) to offer courses on Singapore math and lesson study that teachers can take for salary credit or stipend through the [Scarsdale Teachers Institute](#).

Some people may be wondering if all this training and professional support requires large amounts of money. Well, yes and no. Of course some money will have to be spent initially to provide workshops and training to teachers, just as you would have to do with any new program. I would recommend, however, that schools partner with organizations that can provide support. In Paterson we were fortunate to have the support of the [Gabriella and Paul Rosenbaum Foundation](#), [Research for Better Schools](#), [William Paterson University](#), the [Lesson Study Research Group](#), the [Greenwich Japanese School](#), and others. I would advise schools to look around and develop partnerships with local universities, educational foundations and other organizations. Also, lesson study costs comparatively little and some districts are even able to do it at no cost with some [creative scheduling](#).

### **Self-learning**

One of the best ways to learn how to teach Singapore math is just by teaching it. Since many Singaporean primary school teachers do not have a four-year college degree, [Primary Math textbooks](#) were designed by [Singapore's Ministry of Education](#) so that teachers can acquire the knowledge they need by teaching the program. If teachers carefully study the textbooks, teachers' guides and other material, they can also learn a lot. There are several good [resources](#) available to help them in this endeavor.

### **Parental Support**

In order for Singapore math to be successful you will obviously need parental support. Parents need to understand what Singapore math is as well as what it is not. Unfortunately, some attempts to adopt Singapore math have been derailed by the so-called "[Math Wars](#)" between those who advocate teaching for conceptual understanding and those who advocate procedural and skills proficiency. As I stated in my previous posts, **Singapore math doesn't take sides in this war. Both are important.**

In order to deescalate the rhetoric, schools and school districts need to educate parents and explain to them how Singapore math will help their children as well as the supports that will be offered to both students and teachers to make sure they do well. The Scarsdale schools made and continue to make a diligent and persistent effort to educate parents through parent nights, parent coffees, and other venues where parents can learn about the program and even solve problems using bar models. Parents are mostly interested in how they can help their children. Teachers can help them by addressing their concerns and sharing ideas, games, resources and web sites that they can use to support their children at home.

### **Conclusion**

Given all these considerations, some might be wondering whether it makes sense for schools to take the bold step of using Singapore math. I guess it depends on how far we are willing to go and what risks we are willing to take for the sake of our children and the future of our great nation. Mark Twain said, "Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover."

Well, that's the end of our time together, at least for now. I hope you have enjoyed reading this blog and that it has helped to "demystify" Singapore math for you.

Keep exploring, dreaming and discovering!

Bill Jackson  
Math Helping Teacher  
Scarsdale Public Schools

Part 1: [How I Became Interested in Singapore Math](#)

Part 2: [Can Solving Problems Unravel Our Fear Of Math?](#)  
*The Singapore Math Program philosophy - Problem-based, concrete-pictorial- abstract approach*

Part 3: [Singapore Math: Is This the Most Visual Math?](#) *Bar-Modeling*

Part 4: [How To Bring Singapore Math to Your School](#)

Check out the recent Bill Jackson:  
["Travel Journal To Singapore"](#) Education: Changing Modes

Also:  
["Travel Journal - Japan" Teacher Professional Development. Learning & Teaching Techniques](#)

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