Math in Focus®: Singapore Math® by Marshall Cavendish: Publisher's Background

October, 2021

Math in Focus®: Singapore Math® by Marshall Cavendish is a cohesive and effective mathematics program for Grades K–8 + Accelerated that places problem solving at the heart of learning. The series interweaves the robust fundamentals of ***Singapore Math®*** with the Common Core State Standards for Mathematics (CCSSM) to provide mastery of every grade level's work. Additionally, it has thoughtfully and intentionally included foundational work for the next grade so that students are well poised to experience success at every grade level.

Math in Focus® instruction consistently uses powerful visual models, including bar models, to drive the acquisition of mathematical skills with deep conceptual understanding. Students use these tools, as well as concrete manipulatives and symbolic reasoning, to apply their mathematical skills to routine and nonroutine situations. The problem-solving model nurtures metacognitive thinking and a growth mindset to develop strong, confident problem solvers.

The series is distributed in the United States (U.S.) through Houghton Mifflin Harcourt (HMH). The latest edition of ***Math in Focus®*** was built on the latest findings from learning sciences and academic research that has been demonstrated to lead to improved student mathematics understanding and achievement. This research base is available upon request or from hmhco.com.

Program Foundations

Singapore has consistently ranked among the top in international studies such as Trends in International Mathematics & Science Study (TIMSS) Programme for International Student Achievement (PISA). (2019, report available at timss2019.org/reports; 2018, report available at oecd.org/pisa)

Math in Focus® is the U.S. version of the authentic and successful Singapore curriculum developed by Marshall Cavendish and used by the highest-achieving math students in the world. The series is tailored for the U.S. classrooms through a partnership between Singaporean educators and U.S. experts in ***Singapore Math®*** on the Teacher Edition, that brings together the best practices of ***Singapore Math®*** with the experience of seasoned US educators.

Evidence of Efficacy

Several research studies performed in the U.S. have demonstrated that ***Math in Focus***® is effective in increasing student mathematics achievement. These studies reveal that students using the ***Math in Focus***® program witnessed greater gains in mathematics achievement when compared to similar students using alternative math programs.

Math in Focus® is one of only a few elementary school math programs to receive a "Strong Evidence" efficacy rating from the Center for Research and Reform in Education (CRRE) at Johns Hopkins University. The CRRE created **Evidence for ESSA** to highlight education programs that meet the Every Student Succeeds Act accountability regulations.

In an independent program evaluation, utilizing a gold-standard, Randomized Control Trial (RCT) design, researchers from Empirical Education examined the impact of ***Math in Focus***® on students' math problem solving skills. Researchers found that students who used ***Math in Focus***® scored **significantly higher** than students using other curricula. On average, students using ***Math in Focus***® witnessed a 5 percentile increase in SAT-10 Problems Solving scores over the course of an academic year when compared to control group students.

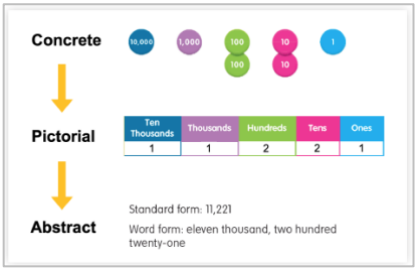
Math in Focus® meets and exceeds the requirements for focus, coherence and rigor through a tightly-woven, articulated and challenging curriculum designed to help students master the math and experience success in CCSSM and beyond at every grade level.

Instructional Approach

Concrete-Pictorial-Abstract Approach

For students to understand math concepts, ***Math in Focus***® starts by showing students physical objects (*concrete*) that they can touch and handle. ***Math in Focus***® students at all grades use concrete manipulatives to create deep connections with concepts from counting to place value to algebraic expressions.

Students also work with mathematical ideas using models or diagrams (*pictorial*). These visual models range from representations of concrete objects to much more abstract depictions of foundational mathematical relationships.

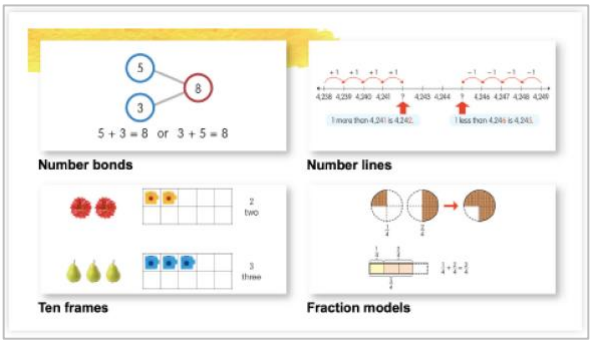


Finally, students connect concrete experiences and pictorial representations to symbols such as numbers and expressions (*abstract*)—bridging them from familiar to unfamiliar. Consistent use of the Concrete-Pictorial-Abstract (CPA) approach, including the use of the visual models, helps students to make connections and develop deep conceptual understanding. These different types of representation not only help build foundational knowledge, they also support

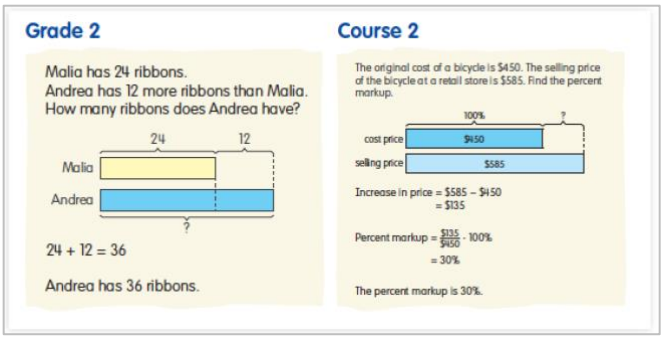
acquisition of novel information, facilitate learning across language levels, and challenge students to show their thinking.

Visual Models

Visual representation is a hallmark of ***Math in Focus***®. Powerful models are featured throughout program levels to build and deepen conceptual understanding.

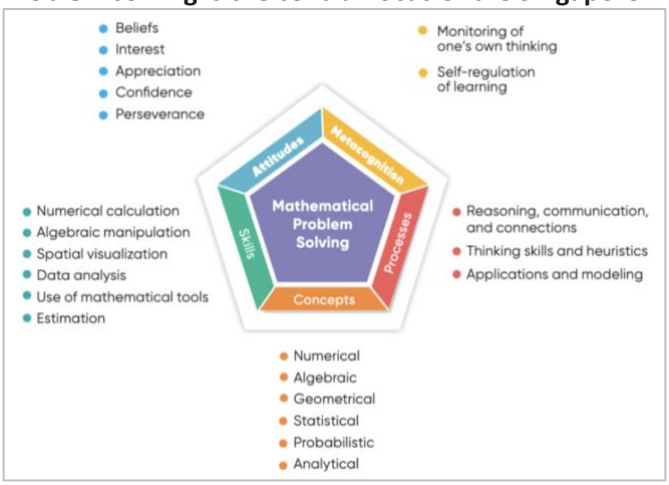


A **bar model** is a form of pictorial representation that is fundamental to ***Math in Focus***®. The bar model method is a step-by-step method that helps students to visualize, understand, and extract information within a math expression or a word problem. The bar model method is a simple modeling approach that is first introduced in Grade 2, and then used consistently through middle school's Course 2.



Problem Solving and the Four-Step Model

Problem solving is the central focus of the Singapore Mathematics Curriculum Framework.

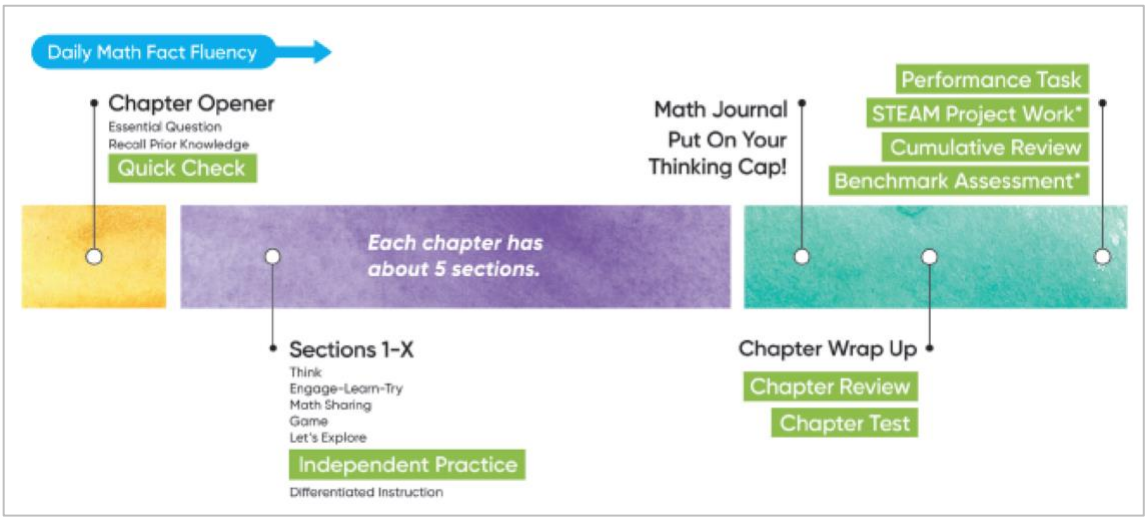


Math in Focus® also focuses on problem solving as central to mathematics learning. Drawing on research by Pólya (1957, 1965, & 1971) and Schroder and Lester (1989), ***Math in Focus***® has students learn **for**, **about**, and **through** problem solving to master concepts fully and apply them to nonroutine, open-ended, and real-world problems. ***Math in Focus***® weaves problem solving throughout each lesson. The problems grow in difficulty from one-step, to two-step, to multistep, to nonroutine. Students are encouraged to explore solving problems using different heuristics or strategies, but are taught a systematic, strategic process for tackling problems using a four-step problem-solving model. This helps students know where to start and to have a positive attitude about math problems in general as well as confidence in their own abilities to succeed. ***Math in Focus***® fosters a growth mindset.

Instructional Pathway

Math in Focus® provides focus on each grade level's topics and delves in-depth into the topics. There is strong emphasis on each of the topics through the Engage-Learn-Try focus cycles. Additionally, formative assessment throughout the Mastery cycle provides teachers with the ability to continually refocus learning on the most critical aspects of a topic. Variation of both perceptual and numerical aspects of exercises help students to see problems in a variety of ways leading to higher levels of mastery.

The instructional pathway throughout the chapters within ***Math in Focus***® provides an effective, blended learning experience for small-group and whole-class implementations. The different parts in each chapter help students get ready through motivating contexts and bridging of any learning gaps, build deep conceptual understanding through engaging and learning activities, as well as master concepts and skills through practice and fluency-building activities. Frequent opportunities for classroom discussion, timely differentiated instruction, and problem solving have also been integrated into the pathway. Chapter Planning Guides, in the Teacher Edition, show in detail how each section can be carried out daily.



Embedded Professional Learning

The Teacher Edition in this edition of ***Math in Focus***® expands the support for teachers to both build their own understanding and support a wide range of students. Each Chapter Overview provides the Math Background followed by the Key Learning Objectives and Concrete-Pictorial-Abstract Progression, as well as the Learning Continuum of grade–to–grade connections. Daily lesson planning support empowers teachers to facilitate quality learning experiences so that students master the mathematics. Within the section instruction, point-of-use support and questioning techniques scaffold and stimulate students' thinking about the "what, how, and why," of their learning process.

More Support for *Math in Focus*® Teachers and Students

This edition of ***Math in Focus***® includes both key print materials and manipulatives and robust digital experience on Ed, the HMH online teaching and learning platform. *Math in Focus* on Ed includes not only alternate formats of most print materials—to supplement classroom instruction and enable remote learning—but also the complete differentiation suite and multimedia supports to engage all learners.

On Ed, digital versions of formative and summative assessments give teachers the data they need to target instruction. In addition, the HMH Growth Measure, an adaptive benchmark, helps teachers and leaders develop a portrait of their students as mathematicians over time.

To ensure a successful implementation of ***Math in Focus***®, HMH offers the following online professional learning support:

- Teacher's Corner, an ever-evolving hub professional learning resources, including live events, ***Math in Focus***® model lesson videos, and teacher tips
- Getting Started live online sessions to prepare teachers for the first few weeks of ***Math in Focus***®
- Follow-Up live online sessions that build understanding of ***Math in Focus***® components, assessments, and differentiation, with topics chosen by the schools and districts

Math in Focus®***: Singapore Math***® ***by Marshall Cavendish*** on Ed, the HMH learning system, combines data-driven insights and ongoing professional support with proven ***Singapore Math***® pedagogy to help U.S. students reach ever-higher levels of math achievement.