Math in Focus Parent University

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Frequently Asked Questions:

1) How does instruction differ in classrooms using *Math in Focus*?

There are several key ways in which the instruction and learning in a *Math in Focus* classroom are unique. The underlying pedagogy, based on a concrete-pictorial-abstract approach to learning mathematics, advises that every concept be taught first at the concrete level with the use of manipulatives. The implications for instruction are that teachers model mathematical concepts using manipulatives and provide students with ongoing opportunities develop understanding through their own experience with concrete materials. Instruction in a *Math in Focus* classroom also leads students to make lasting connections between concrete materials, visual representation and abstract algorithms.

In addition to this, consistent and carefully structured lessons provide children with a systematic way to learn, and the time and opportunities do so. The *Math in Focus* curriculum is both logical and sequential; moving bit by bit to develop key understanding and intentionally lead students to mastery.

2) How will *Math in Focus* meet the needs of my individual child?

Most *Math in Focus* lessons contain opportunities for whole group, direct instruction/modeling, small group cooperative learning and practice, followed by time for independent work. The use of thoughtful questioning techniques during whole group instruction will allow every child to further their understanding of the concept presented. During the guided practice portion of a lesson teachers can take advantage of the first opportunities to differentiate by flexibly grouping students. Games and Hands on Activities are another valuable time to meet the needs of individual students. Once a student has demonstrated their level of independent understanding on the "Let's Practice" textbook materials they are ready to move on to related workbooks activities, extra-practice and/or in some cases the provided Reteach or Enrichment materials.

3) What type of homework can I expect from *Math in Focus*?

Homework is time for independent student work “prove it”. Students need to demonstrate their level of independent understanding. When students struggle, encourage them to develop persistence to solve problems. Asking students questions about their math homework is helpful:

Can you show me….?
Can you explain this….?…… ?
What is the difference between…?

How many ….would be needed for…?
What is/are missing…..?
Please teach me what you know….

Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?".

Teachers use the homework to inform them about teacher instruction (i.e., what the students know, what they don't know).

4) How can I learn more about *Math in Focus* so I can support my child at home?

Classroom videos
http://www.hmhco.com/shop/education-curriculum/math/math-in-focus-singapore-math/features/classroom-videos

5) How are teachers trained to adjust to the differences in program expectations?

Math in Focus professional development provides teachers with an in-depth understanding of the curriculum in addition to suggestions for smoothing the transition into the program. Specialized trainers lead teachers to think about their current classroom practices, recognize the importance of exceptional math instruction, and explore what might shift for their students and themselves when *Math in Focus* is implemented in their school or district. For some teachers this is a larger shift than for others. Some of the most powerful moments of *Math in Focus* professional development occur when teachers have the opportunity to experience the mathematics of *Math in Focus* first hand.

6) How does *Math in Focus* help students prepare for state testing?

This is a question that *Math in Focus* specialists are asked frequently. *Math in Focus* develops students who are able to reason mathematically through consistent use of concrete-pictorial-abstract pedagogy. This approach develops a deep understanding of the content. In addition to this, at every grade level, and throughout every chapter, problem solving is at the heart of content and instruction. The embedded focus on problem solving encourages students to be flexible thinkers who can represent and apply their thinking. These factors, as well as the building of confidence in math, help children tackle the demands of state testing.

Why do we need standards for Mathematical Practice?

Standards in mathematics suitable for 21st century learners must address two kinds of knowledge: mathematical content and mathematical practice.

The content standards are adjusted to reflect new needs and goals, but are essentially familiar in form. They are organized by grade and then by topic, and they comprise a list of facts, procedures, conventions, forms, symbols, and so on, that learners must know and understand. They also specify the skills at which learners must be proficient.

But because the world is changing so rapidly, more is needed. Being prepared to compete in an increasingly complicated and unpredictable world means developing the stamina and disposition to puzzle through totally unfamiliar problems.

The ability to solve new and unforeseen problems requires mastery not just of the results of mathematical thinking (the familiar facts and procedures) but of the ways that mathematically proficient individuals do that thinking. This is especially true in a knowledge-based economy that depends, increasingly, on fields that require mathematics.

Competing in a knowledge-based economy requires great adaptability to unexpected challenges. In fact, changes in technology, economics, suppliers, regulations, and so on, mean that even traditional businesses frequently encounter brand new problems to solve, ones for which no method, formula, or procedure has already been invented and memorized. When the real world throws us a problem, it never asks what chapter we've just studied!

Preparation for this world requires learning to approach new and unfamiliar problems with the confident "I can puzzle this out" attitude. Students need to develop a disposition to tackle problems with only the knowledge they have (or can find on their own) without a pre-learned solution method. They must develop mental habits that dispose them toward describing problems (and solutions) in precise ways, subdividing and exploring problems by posing new and related problems, "playing" concretely (or with thought-experiments) to gain experience and insights from which some regularity or structure might be derived, seeking and articulating underlying structure that might relate new problems to ones that have already been solved, choosing approaches both strategically and flexibly, and so on.

This is how mathematicians think, but the usefulness of these habits of mind extends well beyond mathematics alone. The I-can-puzzle-it-out perspective and all of its supporting habits of mind are necessary foundations of science, medical diagnosis (or diagnosis of a computer or car), law, economics, inventing a business plan, and essentially all inventive or investigative work and critical thought.

The habits of mind can be articulated clearly and illustrated by examples. It is not equally easy to convert these standards into a strict sequence—a curriculum—through which they can be developed. We do understand tasks that help learners develop these skills and dispositions. We don't yet know how to break these skills into tiny bits arranged in a specific order. There may, in fact, be no way to do so. At present, the best we can say is that these mature over long stretches of time—not a lesson or unit or term or even a year.

Therefore, it is necessary to start early. Fortunately, that is also possible. But the fact that we depend on time for the development of mathematical habits of mind does create a difficulty for assessment. Because these remain works in progress for years and because we can't (yet) define discrete stages in their development, we can't say what a child in third grade should be "finished" knowing.

Assessment presents one further difficulty. Not only do these habits of mind develop over time, but at least some of them must be measured in terms of time. For example, measuring perseverance and stamina requires seeing how much time learners will struggle with a difficult problem. Assessments cannot generally be continued over several days, and so we must either settle for proxy tasks or for observations conducted during the course of teaching, rather than during an end-of-term formal assessment. Nevertheless, both the development and periodic rough assessment of these habits of mind that make up the standards for mathematical practice are possible.

Why list practice standards separately from content standards?

Content standards differ by grade. By contrast, one set of mathematical practice applies to all content at all grades. Rather than repeat these standards at each grade level, we list them separately.

Separation also makes it easier to articulate the practice standards clearly, but the intent is not at all to make these a separate skill set to be taught in special lessons or supplements. Quite the contrary, the separation is to emphasize that these essential mathematical habits of mind and action cut across all content topics, pervading the curriculum and pedagogy of mathematics grades K through 12 in age-appropriate ways.

Think Math!
Related Resource: CCSS Mathematical Practices
http://thinkmath.edc.org/resource/mathematical-practice