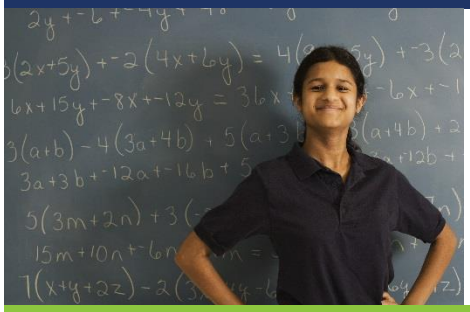

The Inquiry-based Approach to Teaching Math:
Teaching Students to be Mathematical Thinkers

ISA Blog – by N. Gerry House, ISA President

Mary Ellen Tyrell and Sapphira Hendrix do not teach at the same schools. They do not know each other. They do not even teach the same grade levels. However, they are both extraordinary math teachers who are totally committed to using ISA's inquiry-based approach to teach math. Tyrell is the STEM Department Team Leader at the Institute for Health Professions at Cambria Heights, and Hendrix teaches ninth grade Algebra at Brooklyn Preparatory High School. What these two teachers do have in common is a strong relationship with their ISA coaches that has facilitated their development and implementation of inquiry in their math classrooms.

"When I started teaching," Hendrix said, "I had an idea of the kind of teacher I would be. I thought that I would teach the way that I was taught. I would lecture and model how to work a problem. Students would take notes, solve practice problems quietly at their desks, do homework, and love math like I did. I was totally unprepared for 30 ninth graders who were not naturally in love with math. I don't know how I would have survived my first year without the consistent help and support of my ISA coach." Tyrell agrees. She primarily used the I do; we do; you do pedagogical strategy during her pre-ISA coaching years. "Now," she says," my classrooms are 100% student-centered, not teacher-centered. The students take ownership of their learning. My students predict, make inferences, pose ideas and defend them, and have discussions with their peers about why they used a certain process to solve a problem. Their voices, thoughts, and ideas are valued and respected. Using the inquiry approach to teaching math is the best preparation that they could possibly get to succeed at the college level."

Tyrell says, for example, that prior to support from her ISA coach she taught quadratic equations in a more teacher-centered way. Now she presents her students with tasks such as: How long after you take a time-released medication will you have to wait to take another dose? Such tasks require students to represent their solution graphically and as an algebraic equation as well as orally share their thinking with the class. The inquiry approach requires students to integrate knowledge, skills, and concepts and apply a body of knowledge to solve a real-life problem. "They have to demonstrate deep understanding of math, and they have to think critically to perform well on

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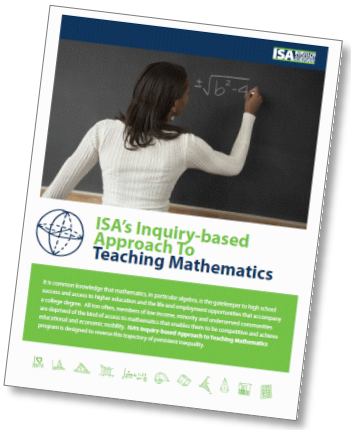
Mary Ellen Tyrell
ISA Math Teacher

these kinds of tasks," Tyrell states. Hendrix points out that math skills, procedures, and processes are embedded in the tasks. "Using inquiry really promotes procedural fluency because the math procedures and skills make sense to the students," she states.

Both teachers attribute their development of inquiry pedagogy to their partnership with their ISA coaches. "I can't imagine being able to meet the demands of Common Core without having had the excellent coaching that I received through ISA," stresses Hendrix. She explains that it was the consistent weekly feedback based on observations in her own classroom and subsequent forward planning that helped her shift her instructional practice. "My coach and I went over every lesson before I presented it to students. One of the biggest benefits of this process was discovering my own knowledge gaps and working with the coach to close them before I tried to teach the students. "Having access to the ISA curriculum was also a huge benefit Hendrix recalls. "It took me eight hours to design a 50-minute lesson. There is no way that I could have designed a lesson from scratch every day."

Tyrell says that the benefits for students of using the inquiry method are not just confined to math. She is proud of how confident and courageous her students have become. "They are not afraid to try even if they do not know exactly how to do something." Tyrell states that she gives each student an ISA performance task so they can demonstrate what they have learned. "I always include one element of something that is unknown, and they are never stymied by this. Not one student pushes the paper away and says, 'I don't know how to do that.' The question that I constantly ask myself is: What do I want my students to do with their lives? I want them to be prepared to be CEOs, not cashiers. I expect them to function at the highest levels possible so that they have real options in life. Using the inquiry-based approach to teaching and learning fosters attitudes and beliefs that will serve them well over their lifetimes. There is nothing in the world I would rather do than this."

Click here to see an inquiry-based math lesson.



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