

## General Information about the Integrated Mathematics Program

\* Donna Dougherty ([Donna\\_Dougherty@wssd.ridleysd.k12.pa.us](mailto:Donna_Dougherty@wssd.ridleysd.k12.pa.us)) on April 8, 1999:

The Interactive Mathematics Program (IMP) is a four-year high school program designed to meet the standards set by the National Council of Teachers of Mathematics (NCTM). Mathematicians, teacher educators, and teachers collaborated to create IMP, intending to replace the traditional program of Algebra, Geometry, Algebra II/Trigonometry, and Pre-Calculus. IMP has been reviewed continuously since 1989; the final materials are the result of field testing by hundreds of teachers and thousands students.

The IMP curriculum is integrated and problem-centered. Most units begin with a central problem that is solved over a period of six to eight weeks. A variety of small problems within the unit enable students to develop the mathematical concepts and techniques needed to solve the central problem. Each unit combines concepts from several branches of mathematics, conveying how important they are in relation to one another. Many of the units are based on real-world situations that have connections with history, science, literature, and economics.

### *Questions and Answers*

My child has always been successful in mathematics. Why are you changing something that is working well?

- When a student is very bright, it is possible for him/her to memorize and recall formulas and procedures. This enables the student to successfully pass courses with a superficial understanding of the material. Manipulating algebraic equations, solving trigonometric identities, or restating a geometric proof is meaningless unless meaning is attached to the symbols. Students must learn to think and learn independently. The students of IMP become confident, capable users and creators of mathematics.

Will my child miss learning traditional Algebra, Geometry, and Trigonometry?

- Students still learn Algebra, Geometry, Trigonometry, and Probability. However, the emphasis in this mathematics class is on teaching students methods to approach new and challenging problems and encouraging them to be open to new ideas and different approaches.

How can a program that is promoted as being effective for all levels of math students be rigorous enough for the brightest students?

- All students are given many opportunities to develop new ideas and to invent their own methods. Students experience how to reason on their own, rather than memorizing procedures. The brighter students enjoy the challenge of more difficult problems and meet the challenge successfully.

Will my child be ready to take the college entrance test?

- Studies show that IMP students have done as well as students of traditional programs on these tests.

### *Reactions from Teachers of the Interactive Mathematics Program*

- As an eighth grade teacher at Strath Haven Middle School, I previously taught Honors Algebra. When the Interactive Mathematics Program was introduced as a possible replacement for the traditional course, I was extremely excited by the approach, but knew that it would be difficult to convince parents of a need to change. However, in the three years that I have been teaching IMP, I have found extremely favorable responses to all aspects of this course. People who deal with mathematics in their careers see that the IMP approach to learning mathematics is beneficial.

- Three years ago, our school replaced the algebra course with the Interactive Mathematics Program. It is my opinion that this course has prepared my students to use mathematics effectively. Students understand procedures well enough to use them as tools for solving future problems. And, the most important benefit of using IMP is the excitement generated by the course. My students enjoy coming to class and enjoy the challenge of working together on new and difficult problems.

### *Reactions from Parents of Students in the Honors IMP 1 Class (Eighth Grade)*

- I am impressed and intimidated by the level of difficulty. I think this approach to mathematics is great.

- I sense that my son's math skills are considerable. It is wonderful to watch and listen to him when he shows genuine excitement for the subject matter.

- I am truly impressed, not only by the difficulty level of the mathematical computation demonstrated in his portfolio, but also by the manner in which the newly learned concepts were applied.

- As a structural engineer, I see these types of problems in my career. IMP's approach to these problems is different from that during my days in junior high, but it is definitely better.

- I am delighted so far with the math. K. seems to be dealing with problems that, for once, stretch her, and she has stopped complaining about boredom in math class.

- This is very interesting work. I appreciate the emphasis on thinking and problem solving.

- Because I was a math major in college, I tend to be more critical of my son's math classes. In the past, I have been more dissatisfied than satisfied with what I have seen. This year, however, I noticed a difference in the approach and how that effected my son's attitude. He has more desire to learn than in recent years.

- I am quite impressed with the scope and complexity of the work covered to date. C. is enjoying the class. She finds the work challenging and exciting.

- I think this class has been the best learning experience J. has had in the middle school. Her growth and confidence from this class has far exceeded my expectations.

\* Gene Klotz ([klotz@forum.swarthmore.edu](mailto:klotz@forum.swarthmore.edu)) on May 15, 1996:

To: Regina Keller, Department Head of Mathematics

I understand that you are advocating the introduction of the Interactive Mathematics Program curriculum into the high school. I have been following this program since 1993. I had the principals interviewed by colleagues from the Geometry Center in Minneapolis.

IMP has since produced one of the strongest and most forward-looking of the many curriculum development projects sponsored by the National Science Foundation. The program is held in high regard by those involved in mathematics education, and it seems to me that introducing their curriculum would be a very positive step for Strath Haven High School.

This is particularly the case since block scheduling should work especially well with the project-based activities of the program. Moreover, the opportunity to rethink the curriculum should prove especially attractive to your strong mathematics teachers and afford them an excellent opportunity for professional growth.

For teachers who are already involved in this kind of project-based mathematics, the curriculum will be welcome and consistent with current efforts. For those teachers who are unaccustomed to this approach, ongoing professional development support will be critical. Workshops and mentorship programs will be available and breakthroughs here should really improve our math program.

In preparing to write you about this, I searched the World Wide Web for current information about the IMP curriculum. I was pleased to find a great deal of material available there about the program and many references to its introduction at schools throughout the country.

I also discussed the program with the publisher, whom I know well, and solicited his frank assessment of the materials. He was quite reassuring, and it appears to me that the approach will enable almost all students to better use mathematics. Careful studies are underway at the University of Wisconsin, and his informal assessment is that both teachers and students often find it more rewarding than traditional approaches.

In my discussion with the publisher, I also laid the groundwork for a possible project with IMP that may prove to be of benefit to the school. With any new program it is necessary to have workshops with the faculty to introduce them to the new ideas. It is highly desirable to have follow-up to the workshops, and this is something my Math Forum project would be able to provide via the Internet. IMP has been approached about setting up moderated discussion groups, which would allow teachers to discuss matters of interest and common solutions to problems. It would be exciting for us to provide such aid, especially when our local school is involved.

In conclusion, I applaud your vision. I believe it would bring good things to Strath Haven High School, and I would endeavor to see that my project contributes to its success.

- Eugene Klotz (Professor of Mathematics, Swarthmore College and Director of the Mathematics Forum)