Award-winning⁴ student enrichment and teacher professional development program for Illinois schools
by the Illinois Mathematics and Science Academy®

www3.imsa.edu/programs/fusion

IMSA FUSION is an award-winning⁴ after-school enrichment program serving 4-8th grade students who are talented, interested and motivated in mathematics and science. IMSA FUSION works with teachers to strengthen inquiry-based instructional strategies in science, technology, engineering and mathematics (STEM). Students attend weekly after-school sessions at their local school. IMSA FUSION partner schools are supported with curriculum kits, lab materials and ongoing professional development and support for the delivery of two program units per year. Teachers participate in Pedagogy, Orientation and Planning Workshops, along with Unit Workshops, for 5-6 days of professional development annually. Students are provided with 64 hours of hands-on, engaging STEM experiences.

FUSION Program Goals
1. Maintain and increase student interest, involvement and literacy in science and mathematics;
2. Enhance the knowledge and skills of teachers in science and mathematics;
3. Stimulate excellence in schools' science and mathematics programs across Illinois;
4. Help increase access to programming for students who are historically underrepresented in mathematics and science or in areas of the state that are under-resourced in STEM opportunities.

Program History and Target Schools
IMSA FUSION originated at the request of the Illinois General Assembly. IMSA FUSION began in the 2000-2001 academic year with seven school sites in Illinois, and now has over 100 programs in the state. To date IMSA FUSION has served nearly 10,000 students.

One important goal of the FUSION program is to increases access for students historically underrepresented or underserved in STEM opportunities. As such, low income, minority students in urban and, or rural school districts are targeted for program participation. Reaching this population will be an ongoing priority and focus as the program continues to expand.

⁴ IMSA FUSION was selected as one of the "Best Practice" K12 STEM Education programs in the nation in September, 2010 by the Bayer Corporation’s Making Science Make Sense initiative for our “proven track of helping girls and underrepresented minorities to participate and achieve in STEM.”
The FUSION Experience
Each active IMSA FUSION school partner serves 20 to 30 students, two teachers, and a site-based program coordinator. IMSA staff members and regional site support specialists develop curriculum, deliver professional development, and provide coaching and support to teachers, administrators and students at each school. FUSION employs IMSA’s recognized core competency of designing, developing and delivering curricular materials and teaching approaches that are competency-driven (standards influenced), problem-centered (“real world”-focused), inquiry-based (student-led) and integrative (connected). Activities used in the IMSA FUSION program are designed to intrigue and engage students, and to keep their interest in math and science at a high level. Students benefit from an array of unforgettable experiences ranging from rocket launches and bridge creations to simulated landfills, self-made kaleidoscopes and leaping origami frogs.

What Teachers Say About FUSION
“[I have been challenged and encouraged to become a better teacher.]”
“Students learn to problem solve in unique situations. They work collaboratively with a diverse team.”

What Students Say About FUSION
“In IMSA we get more depth and detail to expand our view on subjects.”
“In science we read out of a textbook, but in FUSION we interact with the things around us.”

What Principals Say About FUSION
“We are seeing more teachers using hands-on, problem-based activities.”
“Your program reinforces what effective learning strategies are and that our school is on the right track.”

What IMSA Students/FUSION Alums Say About FUSION
“This program prepared me for the rigor and hands-on classes at IMSA.”
“FUSION was an entry point for me in knowing about IMSA and what this school had to offer.”

What Parents Say About FUSION
“The IMSA program has given my daughter great respect for math and science, and she had fun learning after school!”
“My son talked enthusiastically about science! The program made math relevant for him. The explorative environment allowed him to take risks without fear of bad grades!”

IMSA FUSION has a proven impact on both teachers and students

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<th>Teachers report changes in instructional practices due to their participation in FUSION. The Survey of Enacted Curriculum indicates growth in classroom practice in both science and math.</th>
<th>FUSION graduate enrollment patterns in freshmen and sophomore mathematics and science courses indicate advanced coursework and strong performance.</th>
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- **Competency-driven**: 94% reported an increase in the application of math and science concepts
- **Inquiry-based**: 100% reported an increase in use of open-ended, student-driven, high level questioning
- **Integrative**: 94% reported an increase in integrative learning experiences across disciplines
- **Problem-centered**: 100% reported an increase in the use of real-world problems in the classroom

60% take advanced mathematics courses with an average grade of 85%
83% take advanced science courses with an average grade of 89%

Preliminary results based on FUSION graduates in five Illinois high school districts

The Survey of Enacted Curriculum (SEC): Data collected from FUSION teachers indicates an increase in pedagogical practice in math and science instruction in three areas of high student cognition: active learning, demonstration of understanding and communication of understanding. These instructional strategies heighten student cognition, are linked to state standards, and show demonstrated correlation to student achievement.