The ASM Materials Camp® Initiative:  
Getting Young People Interested in Science and Excited about Engineering Careers

To sustain competitiveness in science and engineering, which is vital to the prosperity, sustainability, and security of our nation, there is an urgent need to ensure that a critical number of students annually enroll and successfully graduate in the fields of science and engineering. Currently, the “pipeline” of new engineers is dwindling in the U.S. and in many developed countries. A major cause for this is that most young people are not interested in learning science, nor are they excited about careers in the engineering fields.

The traditional approach of learning science is often intrinsically tortuous for many students. However, recognizing that kids have a natural curiosity about the materials around them, the ASM-Materials Education Foundation (ASM-MEF) has relied on this aspect of curiosity to show students the link between materials and science (e.g., physics, chemistry) and to spur their interest in studying these disciplines.

Motivating Students

The ASM-MEF Materials Camp programs are built on the concept that materials represent the perfect context to enhance students’ interest in further science studies. Once students become interested in learning science, it is anticipated that many of them will choose to pursue careers in engineering. Working with every-day materials through the Materials Camp programs is an effective motivational tool. Furthermore, the effectiveness of this concept (using materials as a gateway to learning science, along with a discovery-based learning approach) has been confirmed by the positive impact on students.

Growth in Student Materials Camps

The first ASM-MEF Materials Camp for high-school students was launched in 2000 at the ASM International headquarters in Materials Park, Ohio. A total of 30 students participated free of charge in this week-long camp. Based on the feedback and success of this first camp, two camps were offered in 2001: one at Materials Park, Ohio, and one at the University of Washington in Seattle. Since then, the number of student camps has grown to 24 camps in 2009. By the end of 2009, the student Materials Camp programs totaled 139 camps, 5,087 participating students, 63 collaborating universities, and over 100 supporting corporations and industrial entities. In 2010, the ASM-MEF is committed to completing 52 camps (24 student camps and 28 teacher camps). Furthermore,
several professional engineering societies have endorsed and/or partnered with the ASM-MEF (e.g., NACE), together with over 200 volunteers serving as mentors and role models for students.

Impact on Students

The effectiveness of this Materials Camp initiative has been measured by following up with camp "graduates." The success of these camps was reconfirmed by the measurable impact on the students, demonstrated by the number of enrollments in engineering fields and materials science branches at various universities. A 2009 survey showed that 84% of the responding students have enrolled in the fields of science and engineering at various universities. Furthermore, 41% of these students have majored and/or are majoring in materials science.

Teacher Materials Camp Program

Recognizing the important role of high-school teachers and their tremendous influence on their students’ future careers, the ASM-MEF initiated in 2002 the first Materials Camp for teachers at the University of Michigan. The camp program was patterned on prior National Science Foundation projects at the University of Washington and Edmonds College, together with programs developed by Battelle Pacific Northwest National Lab in the 1980s and 90s.

These teacher camps (at no cost to the teachers) are run by certified Master Teachers, focusing on enhancing teacher skills and illustrating career opportunities for students in scientific and engineering fields. By the end of 2009, a total of 98 teacher camps were completed with 2,360 participating teachers. The effective content and helpful tools at these camps excited many teachers about materials

84% of ASM Materials Camp® students entered science fields
66% enrolled in engineering
41% majored in materials science

An estimated 4,517 students graduating in science & engineering

Data based on 2009 survey results

ASM Materials Camp®
Students (2000-2009)
139 Camps
5,087 Student Participants

ASM Materials Camp®
Teachers (2002-2009)
98 Camps
2,360 High School Teachers

"... I am confident that the material and resources from this camp will have a lasting and phenomenal impact on my students and many others and will affect their lives and careers in one way or another for years to come!"

Larry Hoffeditz
Wright City High School, Mo.

"I really could not have attended a more professionally done, well-organized, and informative workshop. Invaluable experience I can take back to the classroom and share with fellow teachers!"

James Rathjen, Ph.D.
Pojoaque High School, N. Mex.
science; 87% currently are using tools acquired during the camp in their classrooms. Over 130 camp participants now incorporate materials science content in their regular high-school science classes and are conveying the exciting world of materials science and engineering to their students. The success of the teacher camps is reflected by an increasing number of students interested in taking high school science courses and an increasing number of students registering in science and engineering at the universities where these camps are held.

Achieving the Goals

The effectiveness of Materials Camp programs in getting students interested in learning science and excited about engineering careers represents a step forward to achieving the goal set in Tapping America’s Potential (ref. 1) of “doubling the number of Science, Technology, Engineering and Math graduates by 2015”. In addition, the proven success of the teacher camps is another step forward in fulfilling one recommendation from the National Academies Committee report, Rising Above The Gathering Storm, (ref. 2) to “strengthen the skills of 250,000 teachers through training and education programs”.

Recognizing the lofty goal and important recommendation stated above together with the urgency to achieve them, the ASM-MEF is striving to reach a larger number of students by increasing the number of teachers participating in teacher camps. To accomplish this, the ASM-MEF is preparing to launch a “Pick Up the Pace” (PUP) campaign to double the number of teacher camps to 50 camps per year, throughout the U.S. Plans to ensure a successful PUP campaign are being developed as the ASM-MEF prepares to embark on this challenging, but very exciting and fulfilling journey.

References


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Three Convenient Ways to Contribute.

ASM Materials Education Foundation was founded in 1952, and for over 50 years the organization has been effectively implementing its mission: “To excite young people in materials, science, and engineering careers.”

The Foundation, a 501 (c) 3 organization, finances dozens of undergraduate scholarships, numerous educational outreach activities, and our award-winning “ASM Materials Camp®” program for students and teachers.

The Foundation is governed by a Board representing industry, higher education, K-12 education and national research labs. Significant voluntary and financial support is received from ASM International members and Chapters, corporations and other professional societies.

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