

August 12, 2009

Dear Engineering Firm Leader:

The Engineering Center (TEC) has been involved in an important state-wide program over the past year. We would like to make you aware of that effort and to ask for your company's participation and support. The focus of that effort has been to **increase student interest in science, technology, engineering and math (STEM) subjects and careers**.

As you know, one of the biggest problems facing science and technology-based companies in Massachusetts is that we are simply not producing the quality and quantity of skilled technical workers that we will need in the future.

*Nationally, 26% of high school students taking the SATs indicate they are interested in pursuing a career in Science, Technology, Engineering, and Mathematics.
In North Carolina that number is 32%.
But in Massachusetts, that number is only 20%.*

We are simply falling behind. And, this problem of shrinking student interest begins as early as 6th grade. If students do not take math and science in middle school, then they are not able to take the necessary courses in high school or college to prepare them for STEM careers.

In response to this growing problem, TEC, on behalf of ACEC/MA, BSCES, MALSCE, SEAMass, ITS/MA, SAME and MSPE has been working with some Massachusetts trade associations whose logos appear above. We have banded together to increase middle school students' interest and awareness of STEM careers. Our project, funded by the Massachusetts Department of Higher Education's STEM Pipeline Fund, is **focused on placing STEM Ambassadors (professionals from STEM companies such as your own) into sixth grade classrooms throughout the Commonwealth**, to do two things:

1. Deliver a message to students that by taking math and science throughout school (middle school, high school, and college), students will have a variety of (well-paying) careers that will be open to them; and
2. Inspire students with their personal stories about their enthusiasm for their work, motivation/rewards for going into the STEM field, and the importance of math and science to their job/career.

To help the STEM Ambassadors deliver the message that STEM careers are available to all, the program has developed some **extremely unique and exciting materials as well as two interesting and engaging interactive exercises that showcase the wide variety of STEM careers**.

We piloted our program in 10 schools in June of this year and were pleased to have **our independent evaluator report that the message, materials, and STEM professionals were very well received and that we were having a positive impact on students**.

We now want to dramatically increase our reach. Starting this fall we are attempting to identify 600 STEM Ambassadors who could help us reach the almost 600 schools that have sixth grade classes.

To do this we are turning to technology companies, such as yours, and are asking for your help.

What we are asking from your Company

We would like you to identify 5-10 professionals, in your company, to participate in this project. These individuals should be:

- Approximately 5-10 years out of college or graduate school,
- Enthusiastic about their work,
- Skilled public speakers,
- Able to relate to children.

We hope that the 5-10 volunteers will **include women and people of color**. We are asking that you permit each Ambassador to visit one school and make presentations to a minimum of two math or science classes. Each class is approximately 40-50 minutes long. These presentations can be done in a morning or afternoon.

What the Program will do for your STEM Ambassadors

- Provide them with background materials to understand the problem we are addressing,
- Train them on how to conduct the classroom visit (8 am conference call – 60 minutes),
- Give them a detailed script/talking points for their school visit,
- Provide them with some exciting visual materials and interactive exercises,
- Contact the schools and identify teachers who are eager to host them in their classes.

The bottom line is that, if you can identify 5-10 employees for us, we will take care of the rest. And, your company will become part of a solution to the most challenging issue confronting all of the STEM industries.

I am including additional materials about the project below. I hope you feel as strongly as I do that it is extremely important for companies to participate in this critical effort. Please join us in ensuring that Massachusetts remains a leader in science and technology innovation.

Is your firm interested in joining the STEMTech Ambassador Program? Fill in this form and fax it to 617/227-6783, Att: Susan D'Olimpio or email your list, with email information for each person to sdolimpio@engineers.org

Name _____

Firm _____

Street Address _____ City _____ ST _____ Zip _____

Phone _____ Email _____

Please identify 5-10 professionals, in your company, to participate in this project. To be determined

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Name _____ City _____ Email _____

Comment _____

Thank you, in advance for your consideration of this request. I look forward to working with you on this important project.

Sincerely,

Abbie Goodman
CEO- The Engineering Center
agoodman@engineers.org



STEMTech Alliance
A Collaboration of Five Massachusetts Technology Trade Associations to Increase STEM Awareness in Middle Schools

STATUS REPORT

Goal. The goal of this effort is to develop and implement a **STEM awareness programs for middle school** students across the Commonwealth. Based on focus groups with students, we are targeting sixth graders who appear to be more open to positive discussions about STEM than other middle school students.

Activities in Support of the Goal

1. Research on middle school students' thinking about math and science, STEM jobs, and the attributes they are looking for in a career.
2. Development of a messaging campaign and materials that will increase awareness and interest in STEM subjects and careers.
3. Recruitment of STEM Ambassadors (professionals from STEM companies) who volunteer to go into classrooms to:
 - deliver a message to students that by taking math and science throughout middle school, high school and college, students will have a variety of (well-paying) careers open to them; and
 - inspire students with their personal stories about their enthusiasm for their work, motivation/rewards for going into the STEM field, and the importance of math and science to their job/career.
4. Publication of a guide for STEM Ambassadors that will provide a format and script for the classroom presentation, best practices in presenting to students, and support for engaging the students in two interactive exercises.
5. Pilot Project with 10 schools to test our concept, approach, materials, and impact.

Current Status. We have completed research on middle school students, worked with local advertising agency Arnold Worldwide to develop a comprehensive messaging campaign and materials, and, in June 2009, piloted our program with STEM Ambassadors going into 10 schools and 19 classrooms, reaching more than 300 students. We were pleased to have our independent evaluator report that the message, materials, and STEM professionals were very well received and that our project was having a positive impact on students.

The independent project evaluator collected data from students in the participating middle school classrooms. A total of 286 students from 19 classrooms in 10 different schools completed surveys but teachers reported that over 400 students were affected by the Ambassador visits. Students completed surveys prior to and after the visits. The analyzed data indicated improvement changes in students' attitudes and knowledge of STEM careers and students' perspectives after the Ambassador visits.

- Students were more knowledgeable about the importance of Algebra and were slightly more likely to report they would take algebra in the future.
- Students reported an increased interest in participating in mathematics, science and technology clubs and activities.
- Students were more likely to view STEM careers as fun, interesting and exciting.

We plan to launch the project this fall and are in the process of identifying the STEM Ambassadors we need to reach approximately 600 schools across the state that contain sixth grade classes.



MASS
TECHNOLOGY
LEADERSHIP
COUNCIL



PROJECT DESCRIPTION

Who are We. The following leading Massachusetts technology trade associations came together to design this project and work collaboratively to address a common problem - the lack of qualified students in the STEM pipeline.

- The Massachusetts Technology Leadership Council, Joyce Plotkin, President Emerita (www.masstlc.org)
- The Engineering Center, Abbie Goodman, Chief Executive Officer (www.engineers.org)
- The MassBioED Foundation, Lance Hartford, Executive Director (www.massbioed.org)
- The Massachusetts Network Communications Council, Mark Horan, Executive Director (www.massnetcomms.org)
- The Massachusetts Medical Device Industry Council, Tom Sommer, President (www.massmedic.com)

What We are Proposing To Do. The five technology trade associations, working with their member companies, will attempt to recruit 600 STEM Ambassadors/professionals to visit 6th grade classes in the coming academic year. The Project will:

- Provide background materials, suggested classroom format, and training for Ambassadors;
- Identify the schools willing to host a STEM Ambassador visit;
- Provide a brief questionnaire for students, the teacher, and the Ambassador to fill out before and/or after the visit;
- Evaluate the results of the pilot project to enhance the effectiveness of the effort.

What We are Asking of STEM Ambassadors. Once the Ambassador is selected we will ask him/her to:

- Read background materials on middle school students and the suggested format for the classroom visit;
- Participate in a training session (via conference call), conducted by Project leaders, to review the classroom presentation format and suggested topics that the Ambassador should cover in his/her remarks;
- Talk to the teacher before the classroom visit to describe the program, discuss what the class is currently studying, and invite teacher participation;
- Be prepared to discuss his/her personal story – job and career – with two sixth grade math/science classes;
- Help us evaluate the visit by completing a post classroom visit questionnaire.

What the Classroom Visit Will Include. During the approximately 40-minute classroom visit, STEM Ambassadors will:

- Introduce themselves and the project.
- Conduct two interactive exercises with the students. The activities are designed to broaden student interest and awareness of STEM careers and help students visualize themselves in a STEM career.
- Tell their personal stories - where they work, what they do at work (design the next generation of cell phones, do research on a cure for cancer); what subjects they were good at and which ones gave them a hard time; how they use what they learned in school in their jobs; who or what inspired them to go into their field; why they like their work.
- Talk about the advantages and benefits that come with their STEM-related jobs. Our research on middle school students indicates that they care about the following characteristics in a job/career - team work, good salaries, travel, flexibility, creativity, and making the world a 'better place.' We have designed a poster to leave in the classroom that highlights these benefits letting students know that they are generally present in STEM careers.

For further information, please contact: Joyce Plotkin, Project Chair, President Emerita, Mass Tech Leadership Council, joyce@masstlc.org or Susan K. Moulton, Project Manager, susankmoulton@hotmail.com

STEM FACTS

Massachusetts, and the United States as a whole, is falling behind in the race to produce a future workforce with the skills to work in science, technology, engineering and math fields -- the sectors that are the engine of the Massachusetts economy.

United States

- China graduates four times as many engineers as the US; *Tapping America's Potential, US Business Roundtable, 2005*
- The number of engineering degrees awarded in the US is down 20% from the peak year of 1985 (*Tapping America's Potential, US Business Roundtable, 2005*)
- From 1995 to 2005, the percentage of high school students in the US who indicated interest in majoring in engineering dropped by nearly 35% (*US Business Roundtable*)

Massachusetts

- The number of MA students pursuing STEM studies is NOT growing (*John Hodgman, UMassLowell*)
 - 2002 = 22%
 - 2004 = 19%
 - 2006 = 20%
 - 2008 = 20.5%
- The number of female students studying STEM subjects in College declined between 2003 and 2008 (*John Hodgman, UMassLowell*)
- A 2005 study by Raytheon found that 84% of US middle school students would rather clean their rooms, eat their vegetables, take out the garbage or go to the dentist....rather than do their math homework. (*Raytheon*)
- There is a shrinkage in the number of high school graduates planning to go to college (*Massachusetts Department of Higher Education data on community colleges, colleges and universities, 2008*)
 - 100 students enter 9th grade
 - 82 graduate in 4 years
 - Of these 47 go onto college
 - Of these 25 graduate from college in 6 years
- Of these only 5 major in STEM fields
- Massachusetts does not have data on the number who then actually go into STEM careers

