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Greetings!

A great friend sent me this: "Life's most persistent and urgent question is "What are you doing for others" ~Martin Luther King.

Well, teachers never have time to answer that question... we are always doing something for others — it is what makes us tick; what makes us love what we do; what makes our students get the "Aha!" light bulb moment that can change their lives forever; what makes us the greatest unsung heroes of the 21st Century; and sometimes saps our energy in the deep dark days of winter.

One of the reasons that the MassTEC board members join the board is because they see that there is much to do and few who are doing it at the state and national level. We know that great people are working full time trying to help students prepare for their futures. These professionals need a voice and an outlet to get recognition of their work and political and educational support for what they do.

These reasons fueled the creation of *The MassTEC Express*. It is your voice and your outlet to spread the word that Technology

Engineering education is the T&E of STEM. This is an educational discipline that supports the "3Rs" with the hands-on, minds-on components that make conceptual math real and theoretical science become testable designs.



In this issue:

- ⇒ Checkout the Sputnik Moment by futurist, Jim Brazell — it's a blast!
- ⇒ Consider how our students could go global like GTEC
- ⇒ Apply for a \$10,000 grant from the Lemelson-MIT Program
- ⇒ Find out the latest on the Massachusetts Curriculum Framework
- ⇒ Help us and yourself with a POY or TOY
- ⇒ Take a quick stroll through the ITEEA IdeaGarden (did somebody say garden? I can't wait for the sun and flowers!)
- ⇒ See why we all should join the ITEEA
- ⇒ Check out the sources found by our Webmaster
- ⇒ And a great lesson!
- ⇒ And much, much, more!

A few years back, as I worked on my dissertation, I asked the folks at ITEEA how many Technology Education teachers there were in the US and Canada. I was told that there were somewhere between 25,000 and 39,000 people who might have different titles but were probably teaching in our discipline.

I asked how many of these were ITEEA members. At the time, there were approximately 3,800 members of the ITEEA (now ITEEA).

So one out of 8 or 10 of us support what we do at the national level...

Folks, United we stand...help us help you! Join the ITEEA, Today!

"Start by doing what's necessary; then do what's possible; and suddenly you are doing the impossible." ~St. Francis of Assisi
Thank you for all you do!

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RSA Animate - Drive: The surprising truth about what motivates us
~Dan Pink

<http://www.youtube.com/watch?v=u6XAPnuFjJc&feature=channel>



<http://www.iteea.org/Conference/conferenceguide.htm>

**See You
In
Minneapolis!**

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San Antonio— This is an excerpt from Jim’s excellent article:

Sputnik Moment - The Rocket Boys and Girls of the 21st Century

On the evening of October 4, 1957, at 19:12 Greenwich Mean Time, an R-7 intercontinental ballistic missile lifted off from the former Soviet Union carrying a 23-inch shiny steel orb with four metal antennas named Sputnik. The “Space Age” had begun and along with it a new age of educational urgency and educational reform in the United States.

Today, the questions and circumstances are different than the Sputnik Era; however, the need for urgency and the goal is the same—innovation. On January 29, 2011, I spoke to the Father of the U.S. Global Positioning System, Dr. Francis “Duke” Kane (Col., USAF, ret.). Duke was recognized as a Space and Missile Pioneer by the US Air Force Space Command on March 2, 2010 in San Antonio, Texas. Duke told me, “Similar to Eisenhower’s answer to the Sputnik threat, we must invest in science and technology, education and human creativity.” At 92 years of age, he is the President of the Schriever Institute and still a bellwether for what is next in the “Strategy of Technology.” For the past decade Duke has advocated development of programs to inspire the “speed of light generation” to pursue space exploration with an eye toward Mars and how we can harvest energy from space.

Similar to President Obama, after the launch of Sputnik, President Eisenhower, in 1957, faced rising global tensions, a critical time window and very low tolerance for failure. As it relates to K-12 education, Eisenhower discovered the M.I.T. Physical Sciences Study Committee (PSSC) that had created an initiative to reform the teaching of introductory courses in physics--shifting from rote learning to learning-by-doing.

The first edition of the new high school textbook, Physics, appeared in 1960 and the Teacher’s Guide explains the shift in pedagogy engendered by this new approach as a shift from axiomatic (self-evident truth) to inductive (using observation to move from specific to broader conclusions) presentation of the

curriculum. Similar to PSSC, modern educational STEM practice is undergoing a systematic transformation.

The term STEM was coined by Dr. Judith Ramaley when she was Assistant Director of the Education and Human Resources Directorate at the National Science Foundation (NSF) from 2001 to 2004 (Chute, 2009). Ramaley’s concept of STEM places learning in the context of solving real world problems and creating new knowledge—pursuit of innovation. Spurred by a public and private sector push for global competitiveness, STEM has become a lightning rod for education in 2011.

At work today in your high school or a neighboring high school is a group of students who are learning by creating, designing, building and breaking some new fangled rocket, robot, car, dragster, or video game. These are the rocket boys and girls of the 21st century and the American answer to national innovation, competitiveness and security. In Dallas, Texas, Denton ISD Advanced Technology Center students drove their “Bat Mobile” to a National Electric Dragster Association world record in October 2010. Similar to the PSSC, this is not your traditional science class.



Fredericksburg High School Students launched the RB 12 Rocket

This is an example of Career and Technical Education (CTE) transforming rote learning into practice with high academic standards. Other examples include Fredericksburg

High School students in the Hill Country of Texas participating in Systems Go and launching rockets at speeds of Mach 1 and 2--faster than the speed of sound. Students are now working to break the 100,000 foot ceiling with a 35 pound payload. In San Antonio, Information Technology and Security Academy students have advanced to the Cyber Patriot national hacker defense competition in 2011. In Florida, Orlando Tech students are building video games and using motion capture technology for occupational and physical therapy with an eye toward veterans returning from war with injuries.

In Glendale, California, Clark Magnet High School environmental science students dive a small remotely operated submarine as part of the Lexus Eco Challenge. In this initiative, students study pollution levels in the California spiny lobster and their previous work mapping heavy metals pollution lead to changes in how homeland security and first responders train for diving in the Los Angeles waterways.

In Los Altos, California, Los Altos Academy of Engineering students regularly show up to the Shell Test Track with a surprise for university and industry competitors. In 2007, the Los Altos students showed up to the Shell Eco-Marathon Americas with a fuel car that averaged 1,038 mpg equivalent when everyone fielded solar cars.

The expansion of CTE is both ironic and profound. CTE expansion is ironic because it calls for unification of academic and vocational worlds in the shadow of nearly a century of tradition that drew sharp distinctions between academic and career preparation.

Today, the increasing multi-skill and technologically complex nature of work demands the equivalent of at least two years of education beyond high school for many entry-level jobs. Only 5% of jobs in the American workforce are STEM jobs but about 85% of jobs require some STEM knowledge and skill. This requirement has driven an equivalency for college and career readiness and mainstreamed CTE and career pathways as a method of college preparation in key states.

The CTE movement is profound, because for at least a century, learning-by-doing was associated with the lowest order of

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Sputnik continued

workforce are STEM jobs but about 85% of jobs require some STEM knowledge and skill. This requirement has driven an equivalency for college and career readiness and mainstreamed CTE and career pathways as a method of college preparation in key states.

The CTE movement is profound, because for at least a century, learning-by-doing was associated with the lowest order of intelligence, education, and work. Today, the news from brain research and neuroscience is that humans learn by doing. Integrated CTE, academics, and the arts are emerging as the next evolution of school reform at the same time that the world of science validates methods that are the cornerstone of vocational practice such as project-based learning.

As the 21st century “Sputnik moment” penetrates the national conscience after the recent State of the Union address, it is time for reflection about our perceptions and attitudes about “shop class” and “vocational education.” The role and scope of technology in our world is changing rapidly. Our cell phones now have more computing power than the computers used by NASA to put man on the moon. Our X-box game console has more computing power than any single supercomputer in 1994—with estimates by the super computer association of \$120 million to achieve X-box calculation speeds at the time. Computers are embedded in toys, wash machines, dryers, refrigerators, air conditioners, heaters, sprinkler systems, planes, trains, automobiles, and traffic lights. These systems represent a shift from personal computers to mechatronic and robotic systems—now part of the fabric of 21st century society.

Perhaps more than any external threat such as that posed by the Soviets in 1957, today our personal Sputnik is our feeling of inadequacy in the face of all of the technology present in our lives. Many of hold back and are afraid of technology. We are conservative in the face of change and hold onto the status-quo because we have a sense of control. What we are missing is the technology is not the gadgets and the hardware and the software. It is not the atoms or the

photons or the electrons pulsing through the Internet or our home appliances. Rather, the technology is us. It is our creativity and artistic expression. The technology is the space between our minds and our hands. It is our imagination, our ability to tell stories, our drive to exist and make the world a better place. CTE has a role to play in this creative transformation. At Denton ISD and in pockets of innovation through out the United States one can pursue law, pre-med, engineering, architecture, animation special effects and other career pathways. At schools like Denton’s Advanced Technology Center, Fredericksburg HS, ITSA, Orlando Tech, Clark Magnet and the Los Altos Academy of Engineering places like Denton, the woodshop has become an animation studio, a rocket design lab, an eco automotive workshop, an oceanography laboratory and the conclave for ethical hacking and cyber security.

CTE is an educational movement with a purpose. It is the high school workbench for the inventors, scientists, technicians and artists who will transform our economy and our hopes as we reach for the stars and what is next in the human story. This is the new face of Career and Technical Education. And, it is the hands and minds and dreams of the 21st century rocket boys and girls that are creating how the future works—today!

Fredericksburg High School launched the RB 12 Rocket

Fredericksburg High School launched the RB 12 rocket with support from White Sands Missile Range optics, flight safety, meteorology and communication. The RB12 was designed and developed to produce 2,200 pounds of thrust for 23.5 seconds producing a lift off acceleration of 5-g’s. The fuel grain and nozzle were designed and developed entirely by high school students. (White Sands Missile Range)

What you can do to get involved

Enter a High School in the Cyber Patriot Defensive Hacker Competition Sponsored by the US Air Force Association for a total cost of \$350. Teams that place into nationals travel free to Washington DC in 2011. Learn more about Cyber Patriot. Introduce a Middle School Class to www.Whyville.net and become an entrepreneur, run for Senator, write an

article for the whyville times, design a green energy home or design a cure for the whypox in the bio informatics lab. Whyville is 100% free and offers career simulations in addition to many other activities with over 6 million subscribers served.

Contact Donna McKethan at Waco ISD about her “Robot Math” course called Analytical Integrated Mathematics funded by the US Department of Education. Funded on a Gear Up grant the curriculum is free and in Texas the Career and Technical Education course counts for post Algebra II academic credit.

Inquire about Systems Go rocketry, the Lexus Eco Challenge and Shell Eco-Marathon Americas STEM programs for your school.



About The Author

Jim Brazell is a technology forecaster, public speaker and strategist focusing on innovation systems. Since 2003, Jim has authored several emerging technology forecasts and briefs in addition to consulting on international technology innovation strategies in Portugal and the U.S.

Jim’s mentor and collaborator is Dr. (Col.) Francis X. “Duke” Kane who was recognized in March of 2010 as a catalyst of the global positioning system (GPS) among other achievements. Jim and Duke are the co-founders of spaceTEAMS in San Antonio, Texas, targeting the first person to walk on Mars to be from San Antonio. On January 28, 2011 Jim delivered a webinar for MATEC Networks titled STEM: Mainstreaming CTE. To watch all or part of the 2 hour program online fee, visit MATCH Networks and “create an account” with NSF funded program to view the recording of the webinar from your computer.

For the rest of the article contact Jim at: <http://www.radicalplatypus.com/>

MORE at

<http://www.masstec.org/>



Boston-

The Global Technology & Engineering Consortium

(GTEC) is developing a model for educating students, K-12 and higher education, to succeed in a *flat and diverse globe*.

The intent is to produce 21st century global workforce members who can be effective in and with other countries/ cultures through training and collaboration with business and industry to solve the problems urgently confronting the world's populations.

GTEC's current partners/participants are Franklin Olin College of Engineering (Needham, MA), Keele University and Staffordshire University (UK), Parametric

Technology Corporation, Needham (MA) and Manchester (UK), KMA Diversity & Connecting the Differences Consultants, IL, Davis Square Research Associates, Somerville, MA, November Learning, Marblehead, MA, Nesson Media, Boston, MassCUE and IKZAdvisors, Boston, MA.

The pilot is currently being tested at The Spirit of Knowledge Charter School in Worcester and Haywood City Learning Center (UK) in conjunction with Newburyport High School, Newburyport, MA.

At the end of the program we expect students to be able to develop/ implement/manage projects effectively across cultures, understand how to engage in science and engineering work in other cultures, be able to model global

engineering/technology teamwork roles, relationships and communication skills used by business partners, acquire and use the necessary technical competencies for successful completion of the engineering projects, exhibit research, communication, data collection and processing, and presentation skills, develop creativity, inquiry, high-level thinking as well as problem-solving, design and life-long learning skills and be able to use advanced communication technology for global engineering/ technology/science projects.

The GTEC Leadership Team includes Larisa Schelkin, Founder; Annamaria Schrimpf, President, MassCUE; Julia Sigalovsky, Founder and CEO; The Spirit of Knowledge Charter School; Yevgeniya V. Zastavker, Professor, Olin College of Engineering and Isa Kaftal Zimmerman, Principal, IKZAdvisors. For more information contact larisa.schelkin@gmail.com or ikz1@verizon.net.

Boston-

The GTEC Story

...A Look Into the Future

Forty high school students gather together...On this day, a few are in a classroom in Russia, a few are in their homes in Portugal, Switzerland, Germany, a few are in classrooms in the UK, US, China and India. At Olin College there are eight juniors and a faculty member who have been acting as mentors. In high school classrooms there is also a teacher who has been mentoring those students and a few professional engineers from global companies who have also been mentors.

This is the virtual conference which culminates their GTEC program. Whether they have learned how to work together, leveraging their diversity, learning how to use cultural cues as indicators for action, to solve an engineering project is being determined by a group of business leaders from companies that have provided challenges to them. The business leaders also are attending virtually from those countries.

The companies proposed real challenges to these students to extend their companies' capacity to produce results that can be used in their design and

manufacturing. The project at this time is to create a vehicle which can be suspended over traffic to move people and material around crowded cities. Elements which need consideration are: size, cost, ease of production, energy efficiency, aesthetics/comfort.

The students, all part of one global team focusing on the project, have used a 3D printer which sits on, and prints, to a desk, to share and rework designs across geography. They are presenting together as if they were in one location. All have learned enough English to be able to speak across boundaries through video communication systems. The group has prepared a digital, multimedia presentation about the process of designing the vehicle while exploring the challenges of working together in a virtual global team. They have kept journals of their experiences so they could discuss those challenges and resolve them. The presentation is followed by a question and answer period moderated by one of the GTEC leadership team.

At the end of the three hours, the companies debrief online. The students also debrief and assess their performance and achievement. The next day, a couple of the companies invite the team to their countries to work with the in-house development team to produce a mock up



model that can operate in a variety of countries. The students have demonstrated that they are ready to work and lead in a global environment.

For more information contact larisa.schelkin@gmail.com or ikz1@verizon.net.

\$10,000 STEM Grants Available from MIT



Lemelson-MIT InvenTeams: Inspiring a New Generation of Inventors

The InvenTeam initiative is designed to excite high school students about invention; empower students to problem solve; and encourage an inventive culture in schools and communities.

Cambridge-

Looking for a hands-on, project-based learning opportunity for your students? If so, the Lemelson-MIT Program wants YOU to apply for an InvenTeam grant. InvenTeams™ are teams of high school students, educators, and mentors that receive grants of up to \$10,000 each to invent a technological solution to a real world problem.

The InvenTeam initiative is designed to excite high school students about invention, empower students through problem solving, and encourage an inventive culture in schools and communities. The deadline to submit an application for the 2011-2012 school year is April 22, 2011. For more information, visit the InvenTeams website at:

<http://web.mit.edu/inventeams/>

Cambridge-

What could your students invent with \$10,000?

The Lemelson-MIT Program is accepting applications for its national InvenTeam initiative. InvenTeams™ are teams of high school students, teachers, and mentors that receive grants of up to \$10,000 each to invent a technological solution to a real world problem. Up to \$2,000 of the grant amount can be used as a stipend for the teacher. The projects are year-long allowing for the teams to conceptualize, design, and build their invention; inventions will be showcased at the Massachusetts Institute of Technology at the end of the year.

The InvenTeam initiative is

designed to excite high school students about invention, empower students through problem solving, and encourage an inventive culture in schools and communities. Seven public (academic and technical) and private high schools in Massachusetts have received InvenTeam grants since the initiative's inception in 2003. Invention projects are selected by the team. The deadline to submit an application for the 2011-2012 school year is April 22, 2011.

While the initiative is designed to excite high school students about invention, it tends to be an exceptional experience for teachers, as well. As Gary Menin, physics teacher and mentor of the Bromfield School InvenTeam (Harvard, Mass.) says, "The most rewarding aspect of teaching comes in the application of lessons learned

— and there is no better application opportunity than that afforded by the Lemelson-MIT Program. Success is realized not by having the teacher do the inventing but rather by being a true mentor. Provide the right mix of students the time and place to pool their ideas, get their hands on the project, and bring it to life. The rewards will roll in and vary from sharing your students' excitement to a 'patent pending' or a comment from a parent that you've provided their child with the first expressed reason they look forward to going to school!"



Being creative

can take place in many courses of study and careers. While creativity is most associated with the arts, such as music and literature, it is also associated with technical courses and careers in science, **technology, engineering,** and mathematics (STEM).

Americans tend to think of creativity primarily within the context of art, but Eastern cultures tend to think of creativity as scientific ability (Rogers, 2010). Moving the definition forward to education, Plucker and his researchers wrote that **creativity can be found and cultivated in all people** (Whirly, n.d.)."

~ Leigh Estabrooks

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Boston-
**Update on the Massachusetts
 Science and Technology/
 Engineering
 Curriculum Framework**

Revision, November, 2011

The STE Curriculum Frameworks Review Panel, which began meeting in May of 2009 held its most recent meeting on November 1, 2010. Members from each STE strand, Earth and Space Science, Life Science, Physical Sciences, and Technology/Engineering continued work on standards review and revision.

Although we have done a great deal work, at this time there are no details of the revised standards to share. A standards revision draft will not be released for public comment until after the National Common Core Standards for Science are released. As with the Common Core Standards for Math and ELA, if/when the Common Core Standards for Science are accepted, additional standards may be added. The DESE has decided to wait until the final version of the Common Core

Standards for Science is released to make any changes in the current STE Frameworks. When the Common Core Science standards are released for public comment, the revised Massachusetts STE standards will also be released and public comment will be solicited for both. The release date is not yet set, but it will most likely be after September of 2011. Therefore, no Curriculum Frameworks revision is expected to go into effect before the 2012 school year



The National Research Council (<http://sites.nationalacademies.org/NRC/>) is scheduled to release the final version of its Conceptual Framework for Science Standards in February of 2011. Then, Achieve (<http://www.achieve.org/>) will develop the new national science and engineering standards, among

its resources are the Massachusetts Science and Technology/Engineering Frameworks and the proposed revisions.

The DESE estimates that the implementation of the Science standards is at least one year behind the Math and ELA standards. Watching the process may reveal insights into what the Science field can expect in the near future.

In related news, the Massachusetts Board of Elementary and Secondary Education has proposed additional standards to the recently adopted Common Core Math and ELA Standards. Input from educators is encouraged, until December 10th, through surveys on the DOE website. The Math and ELA surveys can be found at (<http://www.doe.mass.edu/candi/commoncore/survey/>) as well as a survey on proposed High School Math courses and proposed standards for pre-kindergarten ELA and Math.

Respectfully submitted, November 5, 2010.

Mark Kobel
 Technology/Engineering Teacher

Laboratory Safety!

SAFETY

**SAFETY GOGGLES
 REQUIRED**

One of the most important issues concerning laboratory safety is class size.

When we work in a laboratory it is very important how many fingers and eyes we alone are responsible for during each individual class.

Consider too that not all of our students are academically strong. Some have behavior issues, learning disabilities, and some might not want to even be there.

When you throw into the mix the fact that each tool, including hand, portable and stationary has the ability to permanently disable and/or disfigure, safety is the most important consideration in a technology engineering class.

Class size should be a realistic reflection of the students and their social skills that we are working with at the time.

What is your take on safety and class size? Contact me at: ray.mccarthy.masstec@gmail.com

Technology Engineering Education

Northampton-

Northampton High School has one of the largest audio/video production programs in the state. In addition, we offer engineering and culinary arts courses and, in the Fall, will introduce students to our new woodworking shop. Over one third of NHS students attend our technology education classes each year. Please go to our new Web site:

<http://sophia.smith.edu/~mjacobson/NHSMJH/indexnhstech.htm>

to view student work, see course descriptions, and meet our teachers.

Michael Jacobson-Hardy
Technology Education
Northampton High School
Northampton, MA 01062

Email: mjacobson@northampton-k12.us



Joey Savarese built a model of a home in his architecture design/engineering class Northampton High School.

MassTEC

- * Teacher of the year
- * Program of the Year

Apply or Nominate Today!

<http://www.masstec.org/recognition/index.htm>

Hudson-

POY—TOY

MassTEC is offering two recognition programs for technology/engineering teachers: Program of the Year, and Teacher of the Year. The recipients of Teacher of the Year, and Program of the Year will receive a plaque and a \$150 gift certificate to the vendor of their choice. The top two finalists of Teacher of the Year will receive a free MassTEC membership, admission to the following year's MassTEC conference and a year's membership to ITEA. The top two finalists of Program of the Year will receive a free MassTEC membership, admission to the following year's

MassTEC conference. The award recipient(s) will receive a one year membership to ITEA for up to 3 members of the department.

The recipients for the Teacher of the Year and Program of the Year will be eligible to submit an application to the International Technology Education Educator Association (ITEEA) for consideration for the ITEEA Teacher Excellent or the Program Excellent Awards. These awards will be presented at their annual conference.

I ask you to think about applying for one or both of these awards. For additional information and an application for either of the awards please go our web site and look under Recognition Consider Applying for Program of the Year and Teacher of the Year. This section is located on the left side of our web page.

<http://www.masstec.org/recognition/index.htm>

~Charlie Corley, DTE



MORE at

<http://www.masstec.org/>

IdeaGarden & the ITEEA

“In STEM the Engineering & Technology make the Science and Math relevant. Our students are engineering a solution to a problem, and using math and science and tools to gain a greater understanding about what some might only see as only science. Science at its core is only about discovery and not as much about application. Engineers and technologists transfer discovered knowledge from one domain into the pragmatic, to create solutions to problems and to invent products. In fact our students engineer solutions through the engineering design process AND the result is technology. What few people truly understand is that the engineering design process is key to STEM and the result of the process is technology. Technology is the artifact resultant from innovation. Much like Thomas Edison, Dean Kamen, companies like 3M, and DuPont create as well as the earliest of tools such as the plow or even a stone age axe. All of the technology in the world is resultant of a human mind

seeking to solve a problem and more often than not, actually using a form of the design process to create the best solution possible. Engineering and technology are the underpinning of what STEM is. Kids learn, create and apply. They become comfortable in invention, innovation and design which are the greatest assets to the economic wealth of our economy as well as the security of our country. These are assets we must grow today and now, for our students to truly be competitive for the future of our country. We must increase the number and quality of experiences where students learn how to make, do and apply. To invent the future and to be able to maintain the infrastructure of our nation. We need to be focusing on producing in our students world class engineers, technologists and future skilled trades workers. Students need to become literate in all aspects of technology and how it is created, how it evolves, and how to best use it. If we do not, the result will be a continued decline in all aspects of our nation.”

~ Mike Fitzgerald Email: mfitzgerald@doe.k12.de.us

Maine- HABITS OF MIND

“Hi all,
I’m working with 12 high schools in Maine, trying to develop some engineering education in the science classroom. We are interested in habits of mind also. We found some guidance from Engineering in K-12 Education Understanding the Status and Improving the Prospects - NAE 2009. It said, “Engineering habits of mind align with what many believe are essential skills for citizens in the 21st century.

1. systems thinking - understanding connection of parts
2. creativity - generating novel ideas
3. optimism - world view of possibilities and opportunities
4. collaboration - leveraging the potential of team work
5. communication - essential for understanding and sharing
6. evaluating ethics - considering engineering impacts”

In our SCITEC Network ([the] name of our three MSP projects) engineering education research we are finding some habits of mind that need focused nurturing in our classrooms and labs. We are at a disadvantage because we are introducing high school students to engineering and they have not had the prior



experience/education necessary to develop many habits of mind that are very important in design. These include:

1. asking questions is a good way to pursue knowledge
2. there are situations that have no “right” answer, just better answers
3. some learning/work is “messy”, not following a rigid process or formula
4. your first solution idea isn’t necessarily the best
5. you can become “smart” using effective strategies ... and struggling with learning is natural ... usually starting by trying to express what you don’t understand
6. critiquing by (yourself and) others can really help one’s work ... much is to be gained through teamwork.
7. you need multiple attempts to solve “real” problems
8. recording your thoughts and actions is an excellent way of helping yourself think and pursue a solution to a design problem.

We would love to hear from others who are working on developing good engineering habits of mind.”

~Dan Queior:

Email Dan at: dqueior@mmsa.org

Links from the IdeaGarden:

Failure: The secret to success

Honda believes in the Power of Dreams. Watch the short film and other Honda Dreams at the official Power of Dreams

Web site
http://dreams.honda.com/#/video_fa

~ Ray McCarthy

I was looking for some simulations of material testing processes. I found this. It is kinda cool.

~ Mike Fitzgerald
<http://www.steeluniversity.org>

provides **FREE** award-winning e-learning resources on steel technologies for students and steel industry supply chain employees. These include highly **interactive** modules...

Interesting new site... Check out the two Georgia Tech ad’s involving robots and the Engineering program at GT.
~Gary Wynn, DTE

<http://www.engineeringmessages.org/>

<http://www.iteaconnect.org/Networking/IG/IG.htm>
And Join!
<http://www.iteea.org/Membership/>

JETS/AbilityOne National Engineering Design Challenge 2011 Semi-Finals

~ Dick Dieffenderfer

<http://www.jets.org/nedcsemifinals>

or
<http://www.jets.org/programs/nedc/Semifinals2011/2011semifinals.html>

I came across this site for making sawdust. It seems to be a pretty good site for all types of hand and power tools used for shaping and finishing wood. Under “safety glasses” it has a safety link for each power tool along with recent recalls and what to look for or under each power tool listed it will have a safety sheet and other links. ~Jamie Harrington

<http://www.sawdustmaking.com/>



Gardner-

The Time Is Now!

Technology/Engineering is a subject tested by the MCAS. Technology/Engineering has been a standards based curriculum since the inception of the Massachusetts Curriculum Frameworks. Technology/Engineering may be given graduation credit as a Science course by Massachusetts high schools. Yet the Massachusetts Board of Higher Education has not yet officially accepted Technology/Engineering courses as fulfilling Science admissions requirements.

The field of Technology/Engineering was repeatedly mentioned in President Obama's January 25, 2011 State of the Union Address. The President spoke of engineering and innovation, clean energy, biofuels, wind energy, solar energy and most importantly he said, "Maintaining our leadership in research and technology is crucial to America's success. But if we want to win the future — if we want innovation to produce jobs in America and not overseas — then we also have to win the race to educate our kids."

Our kids are educated on these topics by Technology/Engineering! The FY 2007-2008 Annual Report of the Technology/Engineering Advisory

Council for the Massachusetts Department of Elementary and Secondary Education (on which I served) contained the recommendation that "Technology/Engineering courses are valid science courses and should fulfill the Science admissions requirements of the Board of Higher Education;" Yet the Massachusetts Board of Higher Education has not yet officially accepted Technology/Engineering courses as fulfilling Science admissions requirements.

The importance of Technological Literacy through the study of Technology/Engineering is recognized by practitioners in the field. The President of the United States has pointed out the importance of education related to the field of Technology. In order to encourage students to pursue opportunities in this field and to increase technological literacy for all, the time is now for the Massachusetts Board of Higher Education to officially accepted Technology/Engineering courses as fulfilling Science admissions requirements.

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Teachers Should Pitch Their Own Stories

http://blogs.edweek.org/teachers/teaching_now/2010/12/teachers_should_pitch_their_own_stories.html

By Liana Heitin on December 10, 2010 7:00 AM

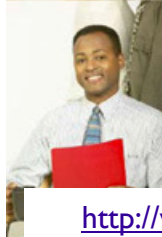
A few highlights from my personal favorite of Learning Forward's keynote addresses.

Michele Norris, the familiar and soothing voice of National Public Radio's All Things Considered, spoke at lunch on Tuesday. Formerly a print and T.V. education reporter for over a decade, Norris lamented that education is no longer part of the core news coverage. "Some newspapers are peeling away the education beat altogether," she said. And these days, she said, education coverage is almost all negative, pointing to failing schools and teacher layoffs.

There are so many "amazing stories" about individual teachers changing lives that are not being shared outside of local communities, she said. "People need to know that education is not just about unions and test scores....It's about people who get up every morning, committed to children." She spoke of a teacher who worried her students did not have enough male role models, and began cooking lunches to entice working men in the community to spend some time with her class. This eventually morphed into a weekly program, where parents did the cooking and area professionals came in to work with students.

At the risk of wagging a finger, Norris offered this insight: "I so rarely hear from educators who are pitching their own stories....So many of us that work in media are willing to share your stories."

(As a fellow member of the media, I can attest to that truth. Some of the best teachers I've seen are also the most humble. And while we do get many stories pitched, they're not often from classroom teachers extolling their own successes.)



Make a Difference

in the technological education of our children!

Do you believe in the importance of the "T" & "E" of STEM?
 Are you looking for resources that will help you further understand current and future trends within technology and engineering education?

If you answered "YES" to either of the above questions, then you should consider joining ITEEA.

You Don't Have to be a Teacher

to SUPPORT STEM EDUCATION!

Membership is available to any ADVOCATE of STEM education.

Advocate Membership: \$40.00

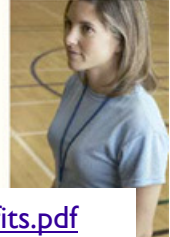
Benefits include:

- Technology and Engineering Teacher (formerly TTT) – Electronic format
- STEM Connections – monthly electronic newsletter
- MEMBERS ONLY on ITEEA Website – valuable resources at your fingertips
- IDEA GARDEN listserv – member-to-member listserv
- Annual Conference Registration discount
- Curriculum materials discount
- Insurance Programs – group-rate discounts

JOIN TODAY and **make a difference**
 in the education of our children.

Questions? Call 703-860-2100.

<http://www.iteea.org/Membership/MembershipBenefits.pdf>





Massachusetts Technology Education/ Engineering Collaborative

From the Webmaster,

Stephen VanVoorhis
coertevanv@msn.com

<http://www.masstec.org/>

The **Massachusetts Board of Education** is receiving a update on the **Science and Technology Engineering Framework revision** on January 25th.
<http://www.doe.mass.edu/boe/docs/0111/item2.html>

Nominate a Great Teacher for 2011-2012 **Massachusetts Teacher of the Year!** DEADLINE FOR NOMINATIONS: February 4, 2011. <http://masstec.org/new.html#mtoy>

WGBH Educational Productions is looking for **K-12 STEM educators** to co-present with WGBH staff at the **NSTA Regional Conference** in Hartford, CT in Nov. '11. <http://masstec.org/new.html#wgbhstem>

UMASS NANOTECHNOLOGY 2011 SUMMER INSTITUTE Monday to Friday, July 11 - July 15 at UMass Amherst <http://masstec.org/new.html#umassnano>

The **Materials Research Science and Engineering Center (MRSEC)** at the University of Massachusetts Amherst is **soliciting applications** from middle and high school teachers for the summer RET program. Benefits include a salary of \$1,000 per week, up to \$1,000 to defray relocation expenses, six graduate credits, and 135 PDPs. The deadline for receipt of applications is *April 7th*. <http://masstec.org/new.html#ret>

The **BHALF competition** is open to teams of four or more students in grades 9 to 12 from high schools and community groups throughout the United States, District of Columbia, and U.S. territories. Teams will develop a flight experiment or technology demonstration and submit a proposal for consideration by a panel of NASA scientists and engineers. The panel will select eight teams to design and construct their project for competition. The eight projects will be sent to the near space environment of the stratosphere, or nearly 100,000 feet above the earth, by several **NASA weather balloon launches** in Northeastern, Ohio. Proposals due February 11th, <http://www.grc.nasa.gov/WWW/balloonsat/>

Just to the south The Connecticut Technology Education Association is hosting a **underwater Sea Perch robot workshop** <http://masstec.org/new.html#seaperch>

The National Aeronautics and Space Administration (NASA) Headquarters released a solicitation on December 29, 2010 entitled NASA Space Technology Research Fellowships (NSTRF) – Fall 2011 Fellowship Start. This call for graduate

fellowship proposals solicits applications from accredited U.S. Universities on behalf of highly qualified individuals pursuing or planning to pursue Master's (e.g., M.S.) or Doctoral (e.g., Ph.D.) degrees in relevant space technology disciplines at their respective institutions. Applications are due on or before **February 23, 2011** <http://masstec.org/new.html#nstrffellowship>

The **West Point Bridge Design Competition** is under way. It is a great free program and there are many curriculum Framework Relations. The Boston Society of Civil Engineers is running a local contest with prizes. <http://masstec.org/lists.html#wpbd>

More from Charlie Corley, DTE:

How Wilson manufactures NFL game footballs
<http://www.reliableplant.com/View/21492/how-wilson-manufactures-nfl-game-footballs>

A fun trip into yesteryear!

It is really the start of the “industrial revolution” with the assembly line method of production. Be sure you watch through to the end....really something!
Enjoy the memory/history lane. This is a You Tube presentation. In case the link below doesn't work, here is the direct URL: http://www.youtube.com/swf/l.swf?video_id=S4KrIMZpwCY

DON'T MISS THIS ONE!!!
"This is a great video showing the first assembly lines at the original Ford auto plant. Neat to see those guys making the old wooden wheels, by hand mostly... The places that car could go...is amazing!"

Team work!

<http://biggeekdad.com/2010/09/fieldstrip-jeep/>

“Dear STEM Supporter-

We commend the National Science Teachers Association for stating that citizens should be scientifically and **technologically literate**. We've advocated including science and technology in the National Science Education Standards since 2004. The NSTA's position reflects a trend to include engineering standards and assessments in national and state K-12 initiatives.

Bravo!
Ioannis Miaoulis and the NCTL team”

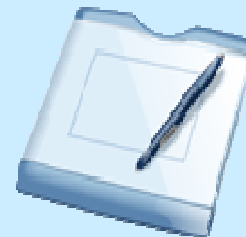
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Clinton-
GIPOF

Name _____ Technology Engineering Mr. Karpuk



Investigating a Technological System

Problem: How do parts of a pen work together as a system?

Skill Focus: observing, inferring, predicting

Materials: retractable pen, paper.

Procedure

1. Examine the retractable pen that your teacher gives you. Predict how many parts make up the pen _____
Disassemble the pen completely. Be careful not to break or lose any of the parts. Below draw each part and describe briefly what function it might serve.

Think about how the pen functions as a technological system. Below describe the goal of the pen as a system. In addition identify the inputs, process, and outputs of the system. Does the pen system include feedback? Identify parts of the pen which might not be essential for meeting the system's goal. Then take the pen apart again and remove those parts. Reassemble the pen without them and test whether or not the pen functions.

Analyze and Conclude

- Observing:** How many parts make up the pen system? ____ Of those parts how many are essential to the pen's function? _____ What purpose do the nonessential parts serve?
- Inferring:** What kind of input do you need to provide to make the pen work? Describe the process and output that results from the input you provide.
- Predicting:** How might adding scent to the ink impact the sales of the pen?
- Forming Operational Definitions:** Based on what you learned in this investigation, describe in your own words what is meant by the term technological system.
- Communicating:** Suppose that you had never used or even seen a retractable pen before today. Write a letter to a friend about this remarkable device and how it works.
More to Explore: Observe another everyday device, a kitchen tool, a paper punch, or child's toy. Observe the device closely to learn how it functions as a system. Try to identify the system's goal, inputs, process, outputs, and feedback.

A system includes a goal, input, process, output, and feedback.

The simplest transportation system is the act of walking to a destination – say to a river to get a drink of water. In this case the **goal** is to move oneself to the river. The **input** needed to do this includes a living body supplied with adequate food, water, and oxygen along with the knowledge of how to get to the river. In this case the transportation **process** is to convert the food, water, and oxygen into the energy needed to get to the river and then decide on what route to take and walk. The **output** is getting to the river, along with sweat, heat, and exhaled carbon dioxide and other gases. In this case let's imagine that our person chose to hike over a hill to get to the river. The **feedback** may be that the hill was too steep and that, in the future, this person will decide to take a path around the hill to get to the river. The transportation system is redesigned to meet a revised goal – to move oneself to the river using less effort.

Many aspects of today's transportation systems are actually outputs from other complex systems. Gasoline comes from oil that must be extracted, transported to refineries, and processed. This system itself relies on political, economic, and military systems that ensure companies maintain access to foreign oil. The refined gasoline must then be transported to local gas stations. Vehicles also need to be manufactured. To manufacture them, minerals need to be extracted from the earth and processed into useable forms. The finished vehicles need to be transported from one location to another. Consider too the infrastructure necessary (bridges, roads, railways, etc.), creative processes of designing vehicles to carry people and goods, marketing schemes, road systems, and traffic rules for organization and safety.

As you can see, identifying all the components of a technology system can be challenging and confusing. The important point is to begin to see the larger picture of the pieces that need to be in place for a technology system to work, in this case a transportation system.

- **GOALS:** A primary goal of any transportation system is to move products and people from point A to point B. Today, we can add recreation as another goal for some transportation systems. Less obvious, but just as important, goals of transportation systems are that they be low cost, get us to our destinations on schedule and in a timely fashion, be safe, and be comfortable. Increasingly, many people would also like our transportation systems to be as close to pollution free as possible and be independent of foreign-controlled resources, such as Middle East oil.

For the rest of this GIPOF...Contact Scott Karpuk at: karpuks@clinton.k12.ma.us

Many have asked if we still had this MassTEC Poster in the 12 x 18 format.

Short answer: No.

However, you can download it and print with our permission if you go to:

<http://www.masstec.org/conferencefolder/conference2009/images/TechEngED%20LIVE%208x11%20poster.pdf>

