Straight from the Frog's Mouth!

The Southern Edition

STEM Literacy

Success in today's knowledge-based economy will require a wide range of technical skills with the ability to apply them in a team-based, problem-solving environment. known as project-based learning.

High School students who are enrolled in the STEM Cluster must be able to solve problems through technology application.

Our teachers should examine what is being taught, how it is being taught, and how the development and growth of creativity should be woven into the educational fabric of our standards. We must make sure our classroom activities integrate strong STEM skills that meet our standards and the CORE standards for STEM.

STEM literacy is an interdisciplinary area of study that bridges the four areas of science, technology, engineering, and mathematics. STEM literacy does not simply mean achieving literacy in these four strands or silos.

A successful STEM education program provides students a sequenced curriculum that builds upon knowledge and skills that can be used with real-world application.

It is imperative that as a nation, we make STEM education a top priority. We have a lot of work to do.

Consequently, a STEM classroom shifts students away from learning discrete bits and pieces of phenomenon and rote procedures and toward having investigating and questioning the interrelated facets of the world.

One hallmark of a STEM classroom is an emphasis on design and problem solving in learning situations that weave together the disciplines through topics such as nanotechnology, environmental engineering, and 3D modeling.

Thus, for example, a STEM classroom might pose a problem and then require students to do original research inspired by a class-wide inquiry project, where they must use technology to gather and analyze data, design, test, and improve upon a proposed solution, and then communicate their findings to their peers.

Today, career success begins and ends with problem solving ability. In today's highly integrated, high tech work environments, the ability to work well in a project team (Project-based learning) is also critical.

Our Standards provides the framework for integrating multiple technical skills successfully.

I challenge every teacher to select activities that integrate STEM and include project-based learning. Each course identifies the Core STEM learning expectations in the beginning of every lesson in our curriculum guides. If we follow the State recommended Path our students will become technologically literate and be prepared for the future.

TN TEE

www.tennessee-teea.org

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Technological Issues - Real Time Data Projects

Summary

Students enrolled in Technological Issues need to apply the engineering design process to a real-life problem that affects them at school, in their community, nation, or the world. The class jointly selects a single problem, then comes up with and tests a design solution. By doing so, students undertake the role of problem-solving engineers.

Engineering Connection

Engineers use the engineering design process to find creative solutions to a wide range of challenges. In addition to designing consumer products, the process is also used to design solutions to infrastructure and systems that benefit society:

1. How do we remove dirty water from homes and make it into clean water?
2. How do we manage the resources of a river to supply everyone's' needs without destroying the natural environment?
3. How can we efficiently and responsibly produce energy and deliver it as electricity to where people need it?
4. How can we design a factory to optimally produce a specific product?
5. How should we lay out the streets and traffic routes to provide access, efficiency and safety?

Learning Objectives

After this activity, students should be able to:

- Explain the important steps of the engineering design process.
- Relate how engineering incorporates this design process in many applications.
- Apply the engineering design process to multiple design challenges in their school setting.

Introduction/Motivation

After you woke up this morning, did any of you experience something that just didn't go right? Maybe you hit snooze on the alarm clock too many times, or you couldn't find your glasses, or you spent too much time picking out something to wear. Did you think about what could be done next time if it were to happen again?

Who remembers the steps of the engineering design process? Remember that the process starts with stating a problem or recognizing a need. This step is important to help us get started thinking of creative solutions or designs to help address our problem. Sometimes a real-world challenge is given to engineers to solve, but other times, an *engineer* must think, "Is there a problem here?" or, "How can this thing or process be improved?"

Sometimes engineers come up with exciting new ideas for a problem by thinking, "Wouldn't it be neat if…? " In other words, engineers might have to come up with a problem themselves. Today, we will identify a problem around our school or in our classroom — maybe the long lunch lines, or your hand hurting from taking a lot of notes. And, then we will use the engineering design process to think of some possible solutions for it.

In the *engineering design process*, we first define our problem statement. The next step is to come up with many potential design solutions by *brainstorming*. Then, we select of these designs by voting on which is the best one. Next, we explain the design to make sure everyone understands it, and we might even present our idea to the principal if we need permission to try it out. After that, we will test the design to make sure it works. Finally, we will review and decide if it is in fact the best solution or if we should *iterate* our design and start over again based on what we learned from our first design. Let's get started!

Technological Issues - Real Time Data Projects

The Students **Challenge** is to tackle the Great Pacific Gyre, helping devise ways to rid the oceans of trash caused by man at different depths without harming sea life.

Students select from everyday items to build their oil containment and clean-up systems, evaluate the effectiveness of their solution and those of other teams, and present their findings to the class.

Trash Island - The Great Pacific Gyre

Did you know that there is a pile of trash that is larger than the state of Texas floating in the middle of the Pacific Ocean?

In this lesson, students work in teams to analyze an "oil spill" in the classroom, then design, build, and test a system to first contain, and then remove the oil from the water.

Students select from everyday items to build their oil containment and clean-up systems, evaluate the effectiveness of their solution and those of other teams, and present their findings to the class.

Real Time Data Projects can be downloaded from Stevens Institute of Technology website by going to http://www.k12science.org/realtimeproj.html

Collaborative Projects can be downloaded from Stevens Institute of Technology website by going to http://www.k12science.org/collabprojs.html

Sample Projects that were covered during the Summer Conference 2010 and at the recent 2010 Annual Symposium.

Core concepts of system engineering

Students apply systems thinking and learn the core concepts of systems engineering as they reverse engineer a common product.

Home Lighting in Developing Countries

Two billion people live in homes that are not connected to the electric grid. Students integrate solar and LED technologies to produce model lighting systems for use in developing countries.

Water Purification

Millions of people around the world do not have access to clean water. During this project schools collaborate to design water purification systems for use in developing countries.

Bio Dynamic Farming

Students are challenged to think critically as they collaborate to design an aquaponics system that sustains plant and animal life

The Noon Day Project

This activity is an opportunity for students to see how mathematics and science work together in explaining a real world phenomenon.

I challenge each teachers who is teaching Technological Issues to get involved in real time activities and the standards and interest of your students will soar.

Another great site to get activities is from ITEEA. Go To: www.iteea.org/Green/green.htm

Career and Technical Education Programs of Study

The Career & Technical Education (CTE) Programs of Study (POS) embrace the state's major economic areas to better prepare students for success after high school and into post secondary education with a focus on high skill, high wage, and high demand careers.

Tennessee CTE Report Card data shows that students who take three or more CTE focus courses have a higher high school graduation rate. Technological advances and global competition have transformed the nature of work. Tomorrow's jobs will require more knowledge, better skills, and more flexible workers than ever before. Tomorrow's workers must be prepared to change jobs and careers several times, continually updating their knowledge and skills. One key approach to this goal is to provide students with relevant contexts for learning. Career Programs of Studies link what students learn in school with the knowledge and skills they need for success in college and careers.

Career clusters articulate programs of study from secondary school to technology centers, community colleges, four-year universities, graduate school, and the workplace, so students can learn in school what they can do in the future. The New High School Graduation Policy requires 2008-09 eighth graders to have a three unit focus of study. Career & Technical POS has been approved by this policy to meet the graduation requirement.

High schools can be organized around career clusters to prepare students to meet the demands of post secondary education and the expectations of employers.

Educators can use a curriculum framework that can be adapted to meet local needs. Professional development materials for teachers and counselors are also available for each cluster.

School counselors can use career clusters to help students explore options for the future. Current Information on the academic, technical and college requirements for a wide range of careers is available for counselors in each cluster. The programs of study within the clusters have linkages to colleges and universities that offer opportunities in the program areas.

Employers and industry groups can partner with schools to contribute to the development of high academic standards that help students prepare for work and help workers keep their skills up-to-date. Employers gain workers prepared to learn new skills, adjust to technological change, and advance in their careers.

Parents can learn what academic and technical courses their children need for college and a variety of career fields. Clusters and the high standards that go with them reassure parents that their children will be fully prepared for college and the workplace.

Students can use career clusters to investigate a wide range of career choices. The career cluster approach makes it easier for students to understand the relevance of their required courses and helps them select their elective courses more wisely.

To learn more about the Career and Technical Education Programs of Study in Tennessee you can download presentation, access the 16 POS, Course Sequences, and many FAQ dealing with our POS. Go to the following website to help with your search: www.state.tn.us/education/cte/ad/clupos/index.shtml.

You can also contact me at 615-532-2844 or email me @ tom.dapolito@tn.gov for further information on Programs of Study in Technology Engineering.

Cyber - Bullying: Tips, tools, and facts!

Cyber-bullying is when kids/teens are tormented, made vulnerable, humiliated, harassed, hassled, embarrassed, targeted, etc. using email, texting, chat rooms, camera phones, facebook/myspace and other websites or other sources of technology. It only counts as cyber-bullying when both the victim and the aggressor are minors.

There does not have to be one clear victim in cyber-bullying. The two sides can switch roles back and forth; alternating positions of superiority. There are serious threats involved and generally they are not a one-time thing. It is often a repeated event and can even contain terrifying death threats. Cyber-bullying allows for those not necessarily intimidating in appearance to release bottled up anger, frustration, hatred, etc. in the form of threats – sometimes empty, sometimes not – and other scare tactics.

Cyber-bullying also comes in a more mild form, with rude language and "basic" harassment. If an adult is contacted early on- cyber-bullying does not have to escalate to an intense level. When dealt with immediately, most harm is avoided. The perpetrator often loses their IM accounts if convicted of juvenile delinquency. In some more serious cases where hacking/password/identity theft are involved, it may be dealt with under state or federal law.

There are two kinds of cyber-bullying, direct attacks and cyber-bullying by proxy (using others to help cyber-bully the victim, either with or without the accomplice's knowledge). Cyber-bullying by proxy often gets more complicated and is very dangerous.

Learning to Identify Cyber-Bullying Tactics
Here are just a few methods that bullies may use: Some may use a form of identity theft, impersonating someone by stealing their screen name to spread rumors, write mean messages, etc. Others may change messages to make fun of someone or Photoshop pictures to tell a different story.

11 Facts About Cyber-bullying

1. Nearly 35% of kids have been threatened online and almost one in five have had it happen more than once.
2. Among this percentage, being ignored and disrespected were the most common forms of cyber bullying.
3. Nine out of ten middle school students have had their feelings hurt online.
4. About 75% have visited a Web site bashing another student.
5. Four out of ten middle school students have had their password(s) stolen and changed by a bully who then locked them out of their own account or sent communications posing as them.
6. About 21% of kids have received mean or threatening e-mails.
7. The psychological and emotional outcomes of cyber-bullying are similar to real-life bullying outcomes, except for the reality that with cyber bullying there is often no escape. School ends at 3 p.m., while the Internet is available all the time.
8. The primary cyber-bullying location where victimizing occurs, at 56%, is in chat rooms.
9. Girls are about twice as likely as boys to be victims and perpetrators of cyber-bullying.
10. About 58% of kids admit someone has said mean or hurtful things to them online. More than four out of ten say it has happened more than once.
11. Cyber-bullying has increased in recent years. In a national survey of 10-17 year olds, twice as many children indicated they had been victims and perpetrators of online harassment in 2005 compared with 2000.

Sources:

Stopcyberbullying.org
National Crime Prevention Council
Isafe.org

Tennessee State Bill 1621

An Act to amend Tennessee Code Annotated, Title 49, Chapter 6, Part 10

To learn more about this bill, go to:
S.B. 1621; http://www.bullypolice.org/TNSB1621.pdf

S.B. 113; A misdemeanor (up to 1 year in prison and a $2,500 fine) for making threats made online as well as certain instances of cyber harassment.

To learn more about all state laws dealing with cyber-bullying you can go to:
http://www.cyberbullying.us/Bullying_and_Cyberbullying_Laws.pdf

A Big Step in Alternative Fuels

Early Monday morning, Dr. Cliff Ricketts hopped into a Toyota Tercel, departed western Virginia, traveled the breadth of Tennessee and finished his day on the west bank of the Mississippi River in eastern Arkansas. Along the way, the MTSU professor made history on a trip that had been 23 years in the making.

The 1994 import traveled more than 500 miles fueled by nothing more than sunshine and hydrogen from water. His only stop for refueling came at his MTSU where he has held court since the late 1970s as one of the nation's leaders in alternative fuel research and development.

"In 1987, Ricketts devised an engine that ran eight seconds on water produced from hydrogen. The next day, it lasted two minutes.

Nearly a quarter of a century later, his vehicle - nicknamed "Forces of Nature" and one of five prototypes has a range up to 370 miles.

"I really feel this is analogous to the Wright Brothers' first flight," the MTSU agriscience professor said while cruising at 60 miles per hour with the windows down along Highway 96 early Monday afternoon. "That plane didn't go but about 600 feet, and it's not worth anything to anybody except the Smithsonian (Institution). But, by gosh, they did it. And I'm doing the same thing."

State Sen. Jim Tracy, the Tennessee Senate Transportation Committee chairman, rode with Ricketts on the Murfreesboro-to-Nashville leg of the trip. Traveling in a separate vehicle behind Ricketts was Jo Borck, a graduate of the Massachusetts Institute of Technology and a leading international expert on hydrogen.

"Dr. Ricketts is way ahead of his time," Tracy said. "… If we can get these alternative fuels where we are not dependent upon foreign oil, it's best for everything. And it's cleaner and cheaper. "So, I am excited about it and looking forward to seeing what comes out of it.

How does it work?

MTSU's solar unit provides electricity that can be used to extract hydrogen from tap water. The hydrogen exits into a pair of 500-gallon storage tanks and then is
compressed before being filled into the vehicle.

"Now, do we have a perfect system? No," Ricketts said. "Do we have a most economical system? Probably not. "But neither did Henry Ford when he developed his first vehicle. You've got to start somewhere. And that's what we're doing."

A key component to Ricketts' research has been the Tennessee Valley Authority's Green Power Switch Generation Partners program.

In the last four years, Ricketts has produced 82 kilowatts of electricity that is stored by Murfreesboro Electric. He has used 22 kilowatts.

"This is great," said James Keiffer, TVA's general manager for customer service in Middle Tennessee. "Dr. Ricketts has taken what was a dream and taken it one step at a time. This is a first step — but it is a big step, though — in alternative fuels.

Lexile Framework for Reading

As educators we know that good reading skills are essential for success in school and career. In an effort to understand more about student read materials, educators must have an understanding of the level of difficulty in a textbook, newspaper, or instruction manual. Career clusters also have Lexile measures for reading ability.

What are Lexiles?

A Lexile measure is the numeric representation of an individual's reading ability or the difficulty of a text, like a book or magazine article followed by an "L" (MetaMetrics, 2010). A student gets his or her Lexile reader measure from a reading test or program. For example, if a student receives an 880L on her end-of-grade reading test, she is an 880 Lexile reader. A Lexile reader measure can range from below 200L for beginning readers to above 1700L for advanced readers. See reader and text measures below in *Chart A.*

Chart A: Typical Reader and Text Measures by Grade

Grade	Reader Measures	Text Measures
1	Up to 300L	200L to 400L
2	140L to 500L	300L to 500L
3	330L to 700L	500L to 700L
4	445L to 810L	650L to 850L
5	565L to 910L	750L to 950L
6	665L to 1000L	850L to 1050L
7	735L to 1065L	950L to 1075L
8	805L to 1100L	1000L to 1100L
9	855L to 1165L	1050L to 1150L
10	905L to 1195L	1100L to 1200L
11 and 12	940L to 1210L	1100L to 1300L

A book, article or piece of text gets a Lexile text measure based on two strong predictors of how difficult a text is to comprehend: word frequency (search engines and directories now use artificial intelligence to analyze the web as they produce sorted search results. Knowing the frequency of words used in your web design will give you more of an idea how these means of artificial intelligence view your web pages.) and sentence length (readability specialists have long suggested aiming for sentences of varying lengths, but with an average of about 20 to 25 words . See literature examples in *Chart B.*

Chart B: Examples of Lexile Text Measures

Literature	Lexile Text Measure
The Good Earth (Buck)	1530L
Little Women (Alcott)	1300L
War and Peace (Tolstoy)	1200L
Animal Farm (Orwell)	1170L
A Christmas Carol (Dickens)	1080L
The Chosen (Potok)	970L
Harry Potter books (Rowling)	880L – 950L
To Kill A Mockingbird (Lee)	870L
The Catcher in the Rye (Salinger)	790L
The Grapes of Wrath (Steinbeck)	680L
The Magic School Bus Inside the Center of the Earth (Cole)	500L
Amelia Bedelia goes back to School (Paris)	360L

Lexile Framework for Reading

Why do I need to know about Lexiles?
"Since Lexiles deal with reading, we need to examine what it takes to be a good reader. Reading is that process that takes place between a reader and his text. Lexiles deal with making that match between reader and text" (Daggett, n.d.). The reading abilities of young people in the same grade at school can vary just as much as their shoe sizes. When a Lexile text measure matches a Lexile reader measure, the reader will likely encounter some level of difficulty with the text, but not enough to get frustrated. This is the best way to grow as a reader—with text that is not too hard but not too easy. See *Chart C* for examples.

Chart C: Textbook Lexile Measures

Textbooks	Lexile Measure
The Making of Memory: From Molecules to Mind; Doubleday	1500
Philosophical Essays: Hackett Publishing	1400
Psychology: An Introduction; Prentice Hall	1300
Business; Prentice Hall	1200
America: Pathways to Present; Prentice Hall	1100
Writing and Grammar Gold Level; Prentice Hall	1000
World Cultures: A Global Mosaic; Prentice Hall	900
Word 97; Glencoe/McGraw-Hill	800
World Explorer: The U.S. & Canada; Prentice Hall	700
Science (Grade 4); Addison-Wesley	600
People and Places; Silver Burdett Ginn	500
Imagine That!; Scholastic Inc.	400
My World; Harcourt Brace	300

Teachers encourage students to read daily, even if what they read is a magazine or newspaper. See *Chart D* for Lexile of newspapers. As students progress through their lives they will encounter reading on a variety of Lexile levels. Preparing them to read at a higher level of comprehension will benefit them throughout their lives. See *Chart E* for a few lifelong reading examples.

Chart D: Newspaper Lexile Measures

Newspaper Lexile	Lexile Level
Reuter	1440
NY Times	1380
Washington Post	1350
Wall Street Journal	1320
Chicago Tribune	1310
Associated Press	1310
USA Today	1200

Chart E: Newspaper Lexile Measures

Lifelong Reading	Lexile Level
Aetna Health Care Discount Form	1440
Medical Insurance Benefit Package	1380
Application for Student Loan	1350
Federal Tax Form W-4	1320
Installing Your Child Safety Seat	1310
Microsoft Windows User Manual	1310
G.M. Protection Plan	1200
CD DVD Player Instructions	

Lexile Framework for Reading

As teachers, we advise and guide students toward career choices in which they are interested or have an aptitude. Dr. Bill Daggett, International Center for Leadership in Education, studied the 16 career clusters. Daggett was "surprised to find that 1) reading demands of blue-collar jobs are almost as high as white-collar jobs and 2) entry-level positions in many job clusters are as high as advanced positions. As CTE educators we must remember that reading in the workplace is becoming even more important than it was before computers. The workplace requires 1100L to 1400L ability!" (n.d.). See *Chart F*.

Chart F: Career Level Lexile

Career Cluster	Advanced	Intermediate	Entry Level
Agriculture & Natural Resources	1380-1420	1290-1370	1270-1510
Architecture & Construction	1310-1370	1180-1310	1210-1340
Arts, AV Technology & Communication	1170-1200*	1190-1320	1110-1190
Business & Administration	1300-1340	1230-1330	1210-1310
Education & Training	1370-1540	1300-1350	1320-1370
Finance	1630-1780*	1280-1450	1360-1480*
Government & Public Administration	1330-1500	1350-1620	1670-1800*
Health Science	1320-1450	1260-1360	1260-1300
Hospitality & Tourism	1230-1260	1250-1260	1230-1260
Human Services	890-1000	1210-1370	1050-1200
Information Technology	NA	1240-1340	1290-1460
Law & Public Safety	1430-1740	1460-1610	1420-1740
Manufacturing	1360-1400	1230-1300	1200-1310
Retail/Wholesale Sales & Services	1240-1280*	1260-1290	1180-1270
Scientific Research/Engineering	NA	1320-1390	1190-1250
Transportation, Distribution & Logistics	1150-1170	1240-1290	1170-1350

Career and Technical Education teachers are not reading teachers; however, we are educators that rely on student ability to read technical material relative to the course of study. Understanding the level at which career and technical materials are written and the level of comprehension students must achieve is essential for student success.

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2010 - 2011 TN TSA Service Project

We encourage all Tennessee TSA Chapters to embrace this years service project. Your will hear more about our Partnership with St. Jude's in the coming months. To learn more about St. Jude's, go to: www.stjude.org

Real World Design Challenges

The Challenge:

The **James Webb Space Telescope** will look backwards in time, seeking clues to the origins of Earth and life in the Universe. There are many challenges to designing this telescope.

Students will try to answer one of these two questions relating to the Webb telescope:

- How can you design a shield to protect the Webb telescope?
- How can you deliver the Webb telescope to space using existing rocket technology?
- Are you ready to solve the challenges of space?

This is a unique education initiative that targets students in grades 9-12 and encourages them to explore and build skills essential for successful careers in Science, Technology, Engineering, and Math (STEM) through two phases of project-based learning and team competition.

The **RealWorld-InWorld NASA Engineering Design Challenge** encourages students in grades 9 - 12 to Explore and build skills essential for successful careers in STEM through two phases of project-based learning and team competition.

Project Background:

The **James Webb Space Telescope** is the next generation deep space imaging system.

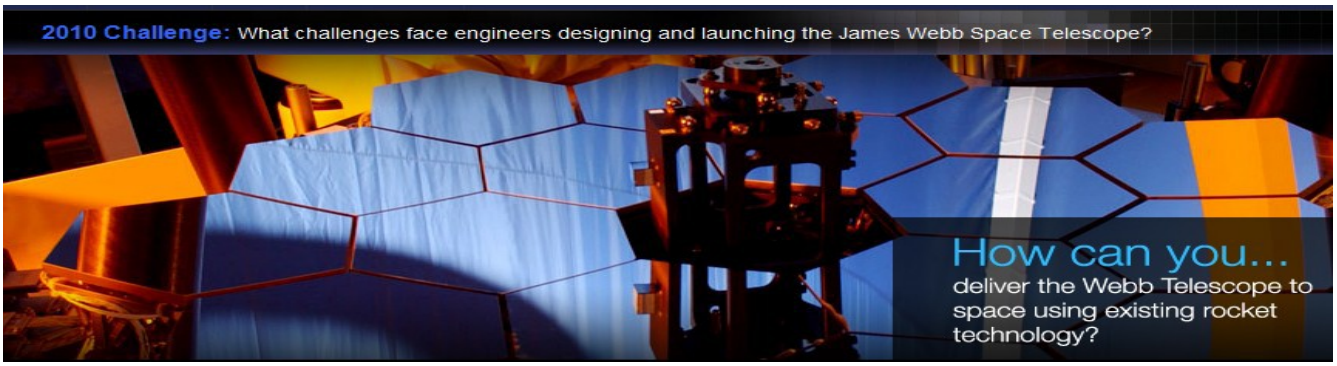
Visit the **Webb telescope home page** to learn more about the science and technology behind this revolutionary telescope.

WHO: teachers and High-school aged students

WHAT: Work collaboratively as engineers and scientists to explore solutions for one of two real-world problems.

Project solutions due by December 15, 2010 to compete for scholarships and technology awards.

For more information click on the following link: **www.nasarealworldinworld.org**



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