2016 Teacher Summit & PK-12 Leadership Forum

Shelly Tornquist
Director, PK-12 Engineering Education Outreach
• [https://www.youtube.com/watch?v=bipTW WHya8A](https://www.youtube.com/watch?v=bipTW WHya8A)
Engineers...

- Be Creative!
- Are in demand!
- Change, or rather CREATE a new world!
- Earn good money
- Make a difference
- Get to do cool stuff
- Work everywhere
- Get to travel
- Work on interesting projects
- Have a good work/life balance

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Women in STEM
http://www.nae.edu/Activities/Projects/grand-challenges-project/Videos_grandchallenges.aspx
The Grand Engineering Challenges

• Make solar energy affordable
• Provide energy from fusion
• Develop carbon sequestration methods
• Manage the nitrogen cycle
• Provide access to clean water
• Restore and improve urban infrastructure
• Advance health informatics

• Engineer better medicines
• Reverse-engineer the brain
• Prevent nuclear terror
• Secure cyberspace
• Enhance virtual reality
• Advance personalized learning
• Engineer the tools for scientific discovery

"Meeting these challenges would be 'game changing,'" said NAE president Charles M. Vest. "Success with any one of them could dramatically improve life for everyone."
More than 25 major branches of Engineering and over 100 specialties!

- Mechanical
  - Nuclear
  - Automotive
  - Petroleum
- Electrical
  - Ceramic
  - Agricultural
  - Telecommunications
- Civil
  - Structural
  - Environmental
- Aerospace
  - Robotics
- Chemical
  - Environmental
- Metallurgical
  - Transportation
- Architectural
- Environmental
- Industrial
- Materials
- Systems
More than half of the existing engineering workforce is over the age of 55! (yikes!)

President’s Council on Jobs and Competitiveness
“...goal to graduate 10,000 more engineering students from U.S. colleges and universities each year...”

Projected need for engineers entering the workforce in Texas:
62,000 more by 2022
STEM – Working together to solve problems based on societal needs and wants

- Scientists
  - Investigates our natural world

- Technologists
  - Applies science and math to our human built world

- Engineers
  - Creates our designed world.

- Mathematicians
  - Uses algorithms to solve problems

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stemsuitt.tamu.edu
Is STEM *just* Engineering?

According to the U. S. Labor Department, the 10 fastest growing occupations from 2008-2018, and their median wages are:

- Biomedical engineers, $77,400
- Network systems and data communications analysts, $71,100
- Home health aides, $20,460
- Personal and home care aides, $19,180
- Financial examiners, $70,930
- Medical scientists, except epidemiologists, $72,590
- Physician assistants, $81,230
- Skin care specialists, $28,730
- Biochemists and biophysicists, $82,840
- Athletic trainers, $39,640

And, arguably, all of these are STEM careers!

https://www.sciencepioneers.org/parents/why-stem-is-important-to-everyone
STEM – When do we start?

<table>
<thead>
<tr>
<th>Dis-Interest</th>
<th>Passive</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t know much about STEM (engineering), but I am certain I don’t like it.</td>
<td>I engaged in STEM (engineering) and it is not for me.</td>
<td></td>
</tr>
<tr>
<td>Sounds interesting. Where I can find out more?</td>
<td>That was exciting. I want more of STEM (engineering)</td>
<td></td>
</tr>
</tbody>
</table>

PreK-3rd grade: Building on and fostering interest
4th – 8th grade: Maintaining & Sustaining interest
9th -12th grade: Transforming interest into career choice

Interest | Dis-Interest
--- | ---
100 | 33
64 | 50
50 | 50
85 | 15
PK-5

- https://www.youtube.com/watch?v=jEiBf33RM3s
Texas House Bill 5 STEM Endorsement

Name of Endorsement: STEM

Pathway:
- Math
- CTE
- Computer Science
- Science

General Requirements:
- Four math
- Four science
- Two elective

Specific Requirements:
- Five (5) courses math (Algebra I, II, Geometry + 2)
- Four courses (2 in cluster)
- Four (4) courses from a wide variety of CS courses
- Biology, Chemistry, Physics + 2 more credits
What makes a great STEM program?
The Curriculum

• Engaging
• Real-world, open ended problems
• “Supplies the formulas” not based on rote memory
• Creative
• Collaborative, but also corroborative
Support & Equipment

• Professional development that extends beyond your district
• Not just a room of “shiny stuff”
• Consumables
• Space
• Organization
• Time
The Teacher

• The essential key to ANY program
  – How resourceful are they?
  – Do they like to tinker, take risks, not afraid if they do not know all the answers. Can they facilitate not just deploy sit and get?
  – Are they an ambassador?
  – Can they transfer the knowledge?
  – Can they help others find their inner courage?
STEM’s Big Secret

Changed Teachers

Changed Students

Changed World!
What’s New in the PK-12 Office

• Me
• Better communication
• Sustaining existing programs
• Determining the state’s need for support and creating partnerships to help train teacher’s and student’s for the future
Ideas?

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On your phone...

https://kahoot.it/#/