STEM Education — Just Do It!

Justifying & Executing STEM Education Within Your Organization

Thomas "Tweeks" Weeks



Created by: tweeks@rackspace.com

Modified Date: 2016-10-03

Classification: External Document





ABOUT RACKSPACE

GLOBAL FOOTPRINTCustomers in 120 Countries



300,000 CUSTOMERS

114,000+ Servers 50,000+ VMs ≅70 PB Stored



10 WORLDWIDE

Data Centers



Over \$2B Annualized Revenue

WE SERVE

 $60^{\%}$ of the

FORTUNE®

100

6,200 RACKERS



PORTFOLIO

of Hosted Solutions

DEDICATED :: CLOUD :: HYBRID







Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)

Contact Info:

tweeks@rackspace.com GPG - 1024D/750152F

https://fb.com/ThomasW.Weeks OTR - tomweeks@gmail.com

@tweeks_tx





Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)

Various Jobs Over 17yrs:

- -Sys-Admin / Engineer, Corp. Technical Trainer
- -Product Engineer, Systems Architect
- -Customer Advocate Engineer, Author / Tech Writer
- -Data Center RCA Team Lead, Cloud RCA Lead
- -Tech Community Relations, Training & STEM Outreach





Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)





Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)







Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)







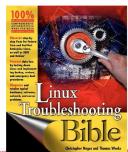
Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)









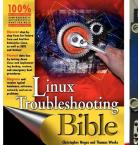
Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)















Name: "Tweeks" (aka Thomas Weeks)

Position: Technical Community Relations (+ other hats)

Started: Sept 1999 (as employee#12, current #1)





(OO) LET'S CODE BLACKSBURG!

















{♥♥**}** ABOUT LET'S CODE BLACKSBURG





{**○○**} ABOUT LET'S CODE BLACKSBURG

Is a Volunteer Based Community STEM Education group

Was Founded in 2012 by Rackspace Developers

Offers Hands On Workshops in Various Languages





STEM = Using lots of cool technology

STEM education is only needed by future scientists

STEM teachers require a Computer Science or pro-certification

STEM programs are expensive

STEM = Using lots of cool technology

STEM education is only needed by future scientists

STEM teachers require a Computer Science or pro-certification

STEM programs are expensive

STEM = Using lots of cool technology





• STEM = Using lots of cool technology



Multimedia Education



STEM = Using lots of cool technology



Multimedia Education





STEM = Using lots of cool technology

FALSE



"In some cases, inventions prohibit innovation because we're so caught up in playing with the technology, we forget about the fact that it was supposed to be important."

— Dean Kamen

Multimedia Education



STEM = Using lots of cool technology

FALSE



"In some cases, inventions prohibit innovation because we're so caught up in playing with the technology, we forget about the fact that it was supposed to be important."

— Dean Kamen

"Technology is how we create wealth, how we cure diseases, how we'll build an environment that's sustainable..."

— Dean Kamen

Multimedia Education



Kamen quotes - www.brainyquote.com/quotes/authors/d/dean_kamen.html

STEM = Using lots of cool technology

FALSE



"In some cases, inventions prohibit innovation because we're so caught up in playing with the technology, we forget about the fact that it was supposed to be important."

— Dean Kamen

"Technology is how we create wealth, how we cure diseases, how we'll build an environment that's sustainable..."

— Dean Kamen

Multimedia Education



Kamen quotes - www.brainyquote.com/quotes/authors/d/dean_kamen.html

• STEM = Using lots of cool technology



Multimedia Education



STEM = Using lots of cool technology



Multimedia Education



Creation / Innovation





STEM = Using lots of cool technology



Multimedia Education

Creation / Innovation





http://tinyurl.com/lego-wedo-scratch http://makeymakey.com/how-to/





STEM = Using lots of cool technology



Multimedia Education



Creation / Innovation



http://tinyurl.com/lego-wedo-scratch http://makeymakey.com/how-to/

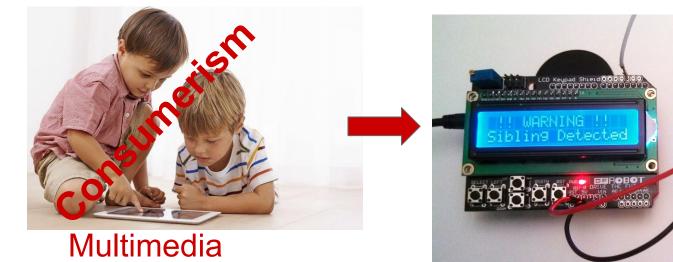


http://tinyurl.com/stem-just-do-it



STEM = Using lots of cool technology

Creation / Innovation





www.eventbrite.com/e/27372824856

Education

STEM = Using lots of cool technology

STEM Should Be About Turning...



STEM = Using lots of cool technology

STEM Should Be About Turning...

Consumers





STEM = Using lots of cool technology

STEM Should Be About Turning...

Consumers into





STEM = Using lots of cool technology

STEM Should Be About Turning...

Consumers



into Creators / Innovators







STEM = Using lots of cool technology

STEM Should Be About Turning...

Consumers into Creators / Innovators





STEM = Using lots of cool technology

STEM Should Be About Turning...

Consumers into Creators / Innovators



STEM = Using lots of cool technology

STEM Should Be About Turning...

Takers



Makers







STEM = Using lots of cool technology

STEM Should Be About Turning...

Takers



"Scratch for iPad" = Pyonkee

"Tired of consuming? Let's enjoy creating! Based on Scratch, Pyonkee provides a real, programming environment, anytime, anywhere!"

https://itunes.apple.com/us/app/pyonkee/id905012686

For Agest 5-8 = http://www.scratchjr.org/ (iPhone + Android) Scratch for Android = https://scratch.mit.edu/discuss/topic/60012/

(in development)



Makers



Using lots of cool technology = STEM

STEM education is only needed by future scientists

Teaching STEM require a Computer Science or pro-certification

STEM programs are expensive

STEM education is only needed by future scientists

FALSE





STEM education is only needed by future scientists
 FALSE

"[Science] is more than a school subject, or the periodic table, or the properties of waves. It is an approach to the world, <u>a critical way to understand and explore and engage with the world</u>..."

— President Barack Obama, March 23, 2015





STEM education is only needed by future scientists. FALSE

"[Science] is more than a school subject, or the periodic table, or the properties of waves.

It is an approach to the world, a critical way to understand and explore and engage with the world..."

— President Barack Obama, March 23, 2015

"Most STEM-literate students follow more regular non-technical careers but with a rich STEM knowledge that can give them a competitive advantage in this increasingly complex highly connected world.

<u>Becoming STEM literate can help any career path...</u>

<u>Many apparently non-STEM jobs have become STEM jobs, especially in the trades.</u>" [1]

— Dr. Richard C. Larson, MIT





STEM education is only needed by future scientists FALSE

"'There's huge holes developing in manufacturing, in aerospace, and in the maritime workforce, and that's all STEM'.. Marie Kurose, the workforce development program manager at the Port of Seattle, said [one of our summer's internship program's goals is to] identify students with some experience in STEM and introduce them to [maritime] jobs they might be interested in as adults." [1]

"Engagement in STEM subjects helps students develop problem-solving, critical thinking, and leadership skills. These skills are so universal, in fact, that [recent statistics indicate] that about three-quarters of the people with a bachelor's degree in STEM fields are not working in those professions. Many non-STEM employers are poaching STEM-qualified job candidates because they are more creative and collaborative than their non-STEM counterparts." [2]





[2] - http://www.stemjobs.com/what-is-stem/

STEM = Using lots of cool technology

STEM education is only needed by future scientists

STEM teachers require a Computer Science or pro-certification

STEM programs are expensive

STEM teachers require a Computer Science or pro-certification



STEM teachers require a Computer Science or pro-certification

STEM is generating inquiry and leading to discovery

"You cannot teach a man anything; you can only

help him discover it in himself."



STEM teachers require a Computer Science or pro-certification

STEM is generating inquiry and leading to discovery

"You cannot teach a man anything; you can only

help him discover it in himself." — Galileo



STEM teachers require a Computer Science or pro-certification

STEM is generating inquiry and leading to discovery

"You cannot teach a man anything; you can only help him discover it in himself." — Galileo

Science is simply critical exploration:

"Equipped with his five senses, man explores the universe around him and calls the adventure Science." — Edwin Powell Hubble



STEM teachers require a Computer Science or pro-certification

STEM is generating inquiry and leading to discovery

"You cannot teach a man anything; you can only help him discover it in himself." — Galileo

Science is simply critical exploration:

"Equipped with his five senses, man explores the universe around him and calls the adventure Science." — Edwin Powell Hubble



Anyone who loves technology can teach technology



STEM teachers require a Computer Science or pro-certification

STEM is generating inquiry and leading to discovery

"You cannot teach a man anything; you can only help him discover it in himself." — Galileo

Science is simply critical exploration:
 "Equipped with his five senses, man explores the universe

around him and calls the adventure Science." — Edwin Powell Hubble



Anyone who loves technology can teach technology



Anyone who loves technology can teach technology



• Grant Martin, Age 12

Anyone who loves technology can teach technology





- Grant Martin, Age 12
- Wrote & Taught "Intro to Java Programming" for Let's Code Blacksburg!



Anyone who loves technology can teach technology





- Grant Martin, Age 12
- Wrote & Taught "Intro to Java Programming" for Let's Code Blacksburg!
- Audience mix of community and <u>VT CS Freshmen/Sophomore Students</u>



Anyone who loves technology can teach technology







70° Broken Clouds

NEWS LOCAL SPORTS BUSINESS WEATHER A&E LIFE OPINION VIDEO PHOTO

For 12-year-old programmer, it's never too early to start

Previous Next



Posted: Saturday, October 18, 2014 5:00 am

By Jacob Demmitt Jacob.demmitt@roanoke.com 381-1661

BLACKSBURG — Grant Martin grabbed a slice of pizza to calm his nerves as he sat down and pulled a microphone closer to his face at Thursday's computer programming class organized by Let's Code Blacksburg.

The classes draw an eclectic crowd of like-minded techies, ranging from 7-year-olds who show up with their parents to 70-year-old IT professionals with local companies.

Let's Code welcomes anyone to attend, but it's not every day the person at the front of the class is younger than the majority of the students.

- Grant Martin, Age 12
- Wrote & Taught "Intro to Java Programming" for Let's Code Blacksburg! [1]
- Audience mix of community and <u>VT CS Freshmen/Sophomore Students</u>



STEM = Using lots of cool technology

STEM education is only needed by future scientists

STEM teachers require a Computer Science or pro-certification

STEM programs are expensive

STEM programs are expensive: FALSE

In a study on <u>barriers and misconceptions of STEM</u> Education [1], <u>Dr. Mokter Hossain</u> (unr.edu) states the solution partly lies in simply <u>getting STEM out of the traditional</u> <u>classroom</u> and exposing kids to <u>extracurricular technology pursuits</u> such as:





STEM programs are expensive: **FALSE**

In a study on <u>barriers and misconceptions of STEM</u> Education [1], <u>Dr. Mokter Hossain</u> (unr.edu) states the solution partly lies in simply getting STEM out of the traditional <u>classroom</u> and exposing kids to <u>extracurricular technology pursuits</u> such as:

- Science & STEM summer camps
- After school STEM programs, math, and technology clubs
- Technology hobbies such as Makerspaces, Ham Radio Clubs, Tech User groups
- Providing lessons on basic Internet boolean searches and research skills



- Providing STEM related magazines (Make, Nuts and Volts, Servo)
- Offer STEM job shadowing opportunities
- Taking computers and technology apart and exploring





FREE Teacher Resources for STEM Learning / Projects

Free STEM curriculum Is Everywhere:



- Let's Code Blacksburg! Code + Classes https://github.com/letscodeblacksburg
- Lady Ada Arduino: http://www.ladyada.net/learn/arduino/
 Raspberry Pi: https://learn.adafruit.com/category/learn-raspberry-pi
- Arduino Project Hub https://create.arduino.cc/projecthub
- Python Game Programming http://pygame.org/wiki/tutorials
- Python Game Programming Tutorial http://programarcadegames.com/
- Kahn Academy for Teachers https://www.khanacademy.org/





FREE Teacher Resources for STEM Learning / Projects

Free Programming languages/IDEs:

- Scratch <u>www.scratch.mit.edu/scratch2download/</u> (just for scratch)
- Arduino IDE <u>www.arduino.cc/en/Main/SoftwareDue</u> (just for arduinos)
- Eclipse IDE http://www.eclipse.org/
- Notepad++ https://notepad-plus-plus.org/
- Sublime Text http://www.sublimetext.com/
- vim http://www.vim.org/scripts/script.php?script id=4599
- Online Programming Courseware:
 - Code.org https://code.org/ (grade school → HS)
 - Code Academy https://www.codecademy.com/learn/all (jr high→adult)
 - Coding Apps <u>Lightbot</u>, <u>CargoBot</u>, <u>MoveTheTurtle / Robot School</u>
 - Coursera Python https://www.coursera.org/learn/python (HS→adult).



• "Giving Back" is Great for Employee Engagement/Retention

Great for Recruiting Both New & Seasoned Tech Experts

Bottom Line: Great for Charitable Giving



"Giving Back" is Great for Employee Engagement/Retention

Great for Recruiting Both New & Seasoned Tech Experts

Bottom Line: Great for Charitable Giving



- "Giving Back" is Great for Employee Engagement/Retention
 - Employee engagement/satisfaction is much higher (360 reviews+NPS)
 - Employee retention rate is 2x as long (as non STEM outreach offices)
 - Watering the community's STEM grassroots = "Pay It Forward" (future talent)

Tip: Host not only STEM, but community causes your people are passionate about

WARNING: Be sure not to "burn out" key employees on doing events. Do check-ups and poll people on feelings, ideas, causes, etc.



• "Giving Back" is Great for Employee Engagement/Retention

Great for Recruiting Both New & Seasoned Tech Experts

Bottom Line: Great for Charitable Giving



- Great for Recruiting Both New & Seasoned Tech Experts
 - Active STEM programs attract seasoned tech-staff (w/kids)



- Great for Recruiting Both New & Seasoned Tech Experts
 - Active STEM programs attract seasoned tech-staff (w/kids)
 - Everyone wants to have an inspiring job:
 - "What we all want from work is to be valued members of a winning team on an inspiring mission." [1]
 - Graham Weston

[1] - www.datacenterknowledge.com/archives/2011/01/14/rackspaces-graham-weston-on-company-culture



62

- Great for Recruiting Both New & Seasoned Tech Experts
 - Active STEM programs attract seasoned tech-staff (w/kids)
 - Everyone wants to have an inspiring job:
 - "What we all want from work is to be valued members of a winning team on an inspiring mission." [1]
 - Graham Weston
 - Passionate community events attract other passionate people
 - Passion is key differentiator on resumes

[1] - <u>www.datacenterknowledge.com/archives/2011/01/14/rackspaces-graham-weston-on-company-culture</u>



63

- Great for Recruiting Both New & Seasoned Tech Experts
 - Active STEM programs attract seasoned tech-staff (w/kids)
 - Everyone wants to have an inspiring job:
 - "What we all want from work is to be valued members of a winning team on an inspiring mission." [1]
 - Graham Weston
 - Passionate community events attract other passionate people
 - Passion is key differentiator on resumes
 - At least ½ of new internships are active in community outreach

[1] - www.datacenterknowledge.com/archives/2011/01/14/rackspaces-graham-weston-on-company-culture



• "Giving Back" is Great for Employee Engagement/Retention

Great for Recruiting Both New & Seasoned Tech Experts

Bottom Line: Great for Charitable Giving



Bottom Line: Great for Charitable Giving

- Increases employee engagement & retention[1]
- Tracking "volunteer hours" earns tax credits[1]
- Sponsoring STEM events earns tax credits[1]

Tip: For corp. outreach events, you may need to Include a mixture of both STEM and and non-STEM activities.

[1] - racksburg.com/community-stem-outreach-just-do-it/



{**○○**} ABOUT LET'S CODE BLACKSBURG

Is a Volunteer Based Community STEM Education group

Was Founded in 2012 by Rackspace Developers

Offers Hands On Workshops in Various Languages



{**○○**} ABOUT LET'S CODE BLACKSBURG

Is a Volunteer Based Community STEM Education group

Was Founded in 2012 by Rackspace Developers

Offers Hands On Workshops in Various Languages

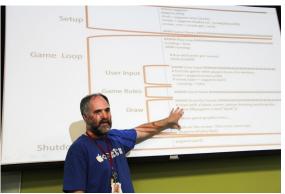


{♥ MORE ABOUT LET'S CODE BLACKSBURG

Volunteer Based Community STEM Education group that...

- o Teaches Kids, General Technology Lovers & IT/Developer Professionals
- Connects Technology Experts → our community of learners
- Grows our technology community through programming workshops









{♥•} MORE ABOUT LET'S CODE BLACKSBURG

Is a Volunteer Based Community STEM Education group

Was Founded in 2012 by Rackspace Developers

Offers Hands On Workshops in Various Languages



{♥♥**}** MORE ABOUT LET'S CODE BLACKSBURG

Was Founded in 2012 by Rackspace Developers

- To Connect & Grow our tech community (like Boston, Austin, San Fran)
- o Is a completely volunteer run, not-for-profit group
- o Are powered by local tech companies, RBTC, and community geek volunteers













{♥•} MORE ABOUT LET'S CODE BLACKSBURG

Is a Volunteer Based Community STEM Education group

Was Founded in 2012 by Rackspace Developers

Offer Hands On Workshops in Various Languages



{00}

MORE ABOUT LET'S CODE BLACKSBURG



Offer Hands On Workshops in Various Languages

- Free/Near-Free 3hr hands on workshops → https://github.com/LetsCodeBlacksburg
- Language Workshops in: C++, Python, Javascript, HTML, .net/c#
- o Technologies Workshop on: Arduino, RaspberryPi, PyGame, Minecraft, BYOD











Questions?





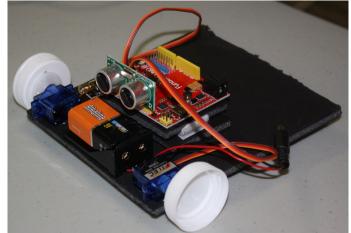
{♥•} COOL LET'S CODE WORKSHOPS



- Mars Laser Bot Workshop → github.com/LetsCodeBlacksburg/LCBB_arduino-collision-bot
 - Arduino/C++ Programming
 - Build & Program "Trash Bot" with laser cannon
 - Take it home to continue learning for around \$30 in parts











{♥•} COOL LET'S CODE WORKSHOPS



● Teach the Teachers Arduinos→github.com/LetsCodeBlacksburg/arduino-recipes



- How-To-Teach Arduino Workshops <u>www.eventbrite.com/e/26754451284</u>
- o Taught intro arduino theory, workshop overviews, cheat-sheets
- Sent teachers home w/\$25 mini arduino kits & LCBB curriculum











{♥♥} COOL LET'S CODE WORKSHOPS

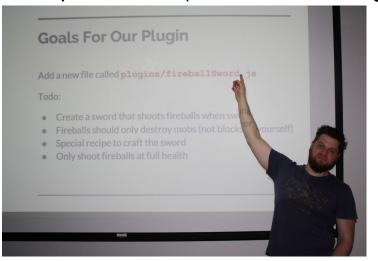




- Minecraft Mod Hacking w/Javascript→github.com/LetsCodeBlacksburg/Scriptcraft-Spigot
 - Kids Series Two Night Minecraft Mods Hacking (Oct 8-9) eventbrite.com/e/28149940229
 - Teach kids Javascript programming with Minecraft JS server

- 台
- Sent kids home with Minecraft/Javascript installed (for further learning)







{♥•} COOL LET'S CODE WORKSHOPS





Kids Series - Getting Started w/PyGame www.eventbrite.com/e/16110833938



- Teaches kids basic python, animation, collision detection
- Sent kids home with Python + PyGame installed & running (for continued learning)

