40 STEAM Programs in 40 Minutes

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KDLA 2013 Summer Reading Conference
Today’s Goal

• Define STEAM
• Simple and engaging programs for all ages
• 8 programs per category
• Family Festival Nights
• Hands-on Q&A following presentation...
STEM: A Framework for Teaching Across the Disciplines

STEM = Science & Technology interpreted through Engineering & the Arts, all based in Mathematical elements.

Content Specific
- Discipline Specific
- Multidisciplinary
- Integrative
- Life-long Holistic

SILOS
- History of Ideas & Concepts
- Processes
- Inquiry
- Physics
- Science
- Biology
- Chemistry
- Space & Geosciences
- Biochemistry

Technology
- Nature of Technology & Society
- Design
- World Abilities
- Designed World

STEM
- Aerospace
- Fluids
- Architectural
- Agricultural
- Civil
- Computer
- Mining
- Acoustical
- Chemical
- Electrical
- Environmental
- Industrial/Systems
- Materials
- Ocean
- Mechanical
- Naval
- Architectural

Arts
- Literature
- Fine/Manual
- Language
- Liberal

Mathematics
- #’s & Operations
- Algebra
- Geometry
- Measurement
- Data Analysis
- Probability
- Reasoning
- Proof
- Communication

www.STEAMedu.com
C.2006-2011 G. Yakman

http://steamconnect.org/
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8 Super SCIENCE Programs...
1.) Archaeology

• Grades 3-8

• Explaining how systematically archaeologists dig up excavation sites.
2.) DNA

- Middle & High School
- Candy DNA Model
- Phenotype vs. Genotype with SpongeBob
- DNA Extraction: 
  - [http://www.youtube.com/watch?v=hOp4iN5Bh4](http://www.youtube.com/watch?v=hOp4iN5Bh4)
  - [http://teach.genetics.utah.edu/content/begin/dna/Have%20Your%20DNA%20student.pdf](http://teach.genetics.utah.edu/content/begin/dna/Have%20Your%20DNA%20student.pdf)
3.) Do You Know H2O?

• Grades 3-8

• Water Molecule
  – With Styrofoam
  – Older groups: explain why molecule is H2O (electrons!)

• Water Experiments
4.) Body Movin’

- Grades 4-7
- Human body activities
  - Learn how tendons move hands
  - Brain
  - Bones
  - Digestive system
5.) Seed Balls

• All ages

• Earth Science

• Gardening fun!

• Clay helps to protect seeds and conserve moisture, soil provides nutrients, seeds stimulated when it rains.
6.) Space

- All ages
- LPI Explore programs
  - [http://www.lpi.usra.edu/education/explore/](http://www.lpi.usra.edu/education/explore/)
- NASA Apps
- Expose children and teens to the wonders of space science.
7.) Chemistry in a Bag

• Cincinnati Museum Center’s Programs-on- Wheels
• Middle & High School
• Take home activity: DIY Slime
8.) Paranormal Activity

• Teen Ghost Walk
• Partner with local history departments and PINK (Paranormal Investigators of NKY)

• Science Components:
  • Temperature Reading
  • Barometric Pressure
  • Electromagnetic Reading
  • Shadows
8 Terrific TECH Programs...
1.) Brush ‘Bots

• DIY Robot
• Grades 4-8
• [www.makershed.com](http://www.makershed.com)
• STEAM Components:
  – Science
  – Technology
2.) Coder Camp

- All ages
- High school students can lead workshops for K-8
- [http://code.org/learn/codecademy](http://code.org/learn/codecademy)
- STEAM Components
  - Technology
  - Math
  - Art

**will.i.am**
Musician/The Black Eyed Peas and Entrepreneur

"Here we are, 2013, we ALL depend on technology to communicate, to bank, and none of us know how to read and write code. It's important for these kids, right now, starting at 8 years old, to read and write code."
3.) DIY Video Games

- [www.sploder.com](http://www.sploder.com)
- Grades 2-5 or 4-8
- Flash-based; no downloads needed
- Free!
- Weekly contests will highlight and publish best original games.
4.) Book Trailers

- Middle & High School
- Video Editing
- Microsoft Movie Maker
- Instagram or Vine?
- STEAM Components
  - Technology
  - Art

**Flip Out for a Good Book**
Book Trailer/Video Review Contest
(teens ages 13 - 18)

Read a good book? Tell the world with a book trailer (like a movie preview but featuring the story and characters of your favorite book instead).

Create a book trailer or video book review and upload it to YouTube. Visit our website (or the library) and fill out an entry form.

Videos will be posted on the library’s website during Teen Tech Week, March 6-12. Teens will vote for the winners!

One Grand Prize winner will receive a Flip HD Camera and two runners-up will receive Best Buy gift cards.
5.) Podcasting

- High School
- Sound Editing
- Audacity software
- Great for TAG’s!
- STEAM Components
  - Technology
  - Art
6.) Computers Inside Out

• Middle and High School
• Help build a computer from recycled parts to be donated to the Homeward Bound Shelter for homeless teens in NKY.
• Approximately 220 million tons of E-Waste is generated annually in the U.S.
• Friday, November 15, 2013/ America Recycles Day

www.americarecyclesday.org
7.) Geocaching

- All Ages
- Great family program
- Partner with local parks
- Don’t need expensive equipment: can use tablets and smart phones with GPS and offline Google Maps

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8.) App-y Hour

~ Come & Discuss Your Favorite APPs for Smartphones & other devices! ~

Learn!  Share!  APPy Hour  Every 2nd Thursday of the Month @ 7 PM  in the Conference Room

~ Light Refreshments Provided by the Friends of Freeman ~

Information for Persons with Disabilities: Harris County Public Library will make reasonable accommodations for people with disabilities who are interested in attending library programs. To make a request, notify the Branch Librarian two working days in advance of the program.
8 Engaging ENGINEERING Programs...
1.) Rube Goldberg Machine

- Middle & High School
- Create a machine that completes a simple task in a more complicated fashion.
- Work together as a team to engineer a machine (series of simple machines)

- BCPL Rube Goldberg Machine: http://www.youtube.com/watch?v=qbLMNw4Hdv0
- Simple examples on YouTube:
  - http://www.youtube.com/watch?v=dFWHbRApS3c
  - http://www.youtube.com/watch?v=PQ_Y545MFpc
  - http://www.youtube.com/watch?v=UMOEFIs04wM
  - http://www.youtube.com/watch?v=eSyCDyNf5K4
2.) Lunar Landers

- Grades 3-12
- Alternative Program: The Great Egg Drop

- Learning the importance of balance and ingenuity for creating moon landers for astronauts.
2.) Rockets!

- Grades 3-8
- Aerodynamics, force, design
- Tea Rocket - fire
- PVC pipe Rocket Launcher
- Balloon Rockets
3.) Monumental Creations

• Grades 3-5
• STEAM Components
  – Engineering
• Makedo:  http://mymakedo.com/
• Marshmallow architecture
• Geodesic Dome:
  – http://www.youtube.com/watch?v=jYfszzzZg1c
4.) Marshmallow Catapults

• Grades 3-8

• Create different types of catapults and test them out.

• Levels, force, distance, measurements
5.) Mentos & Soda Pop

- Grades 3-8
- Fizzy Fun - could also incorporate vinegar & baking soda experiments
- Using PVC pipe, teams can create a super Mentos drop.
  - http://www.stevespanglerscience.com/lab/experiments/mentos-soda-podrop
6.) Trash to Treasure

• Spend less money by upcycling old stuff to create something new.

• Alternative Program: FrankenToys
7.) Earthquake Proof Structures

- Free papercrafts downloads at Canon
- Scientific American Activity: Lego Sky Scrapers
- **Key concepts:** Engineering, Architecture, Physics, Earthquakes
8.) Minecraft

• Grades 4+
• Check tech specs!
• *Could Minecraft be the next great engineering school?*
  
  – *Yahoo Finance, Nov 30, 2012*
8 Awesome ART Programs...

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1.) Pointillism

• Grades 3-12

• Brain science – how colors are processed in the brain

• Work in teams to create large pieces of artwork to be displayed
2.) Kinetic Sculpture

• Middle School

• Art and engineering

• Trial & error involved in creating an art piece that moves
3.) Tall Paintings

- Grades K-12
- STEAM Components
  - Art
  - Science
- Artist: Holton Rower
4.) Art Sculptures

• Grades 3-12

• cardstock cut into 1” x 11” strips, cardstock for base, glue sticks

• pool noodle cut to approximately 3” height, chenille stems, paper (for flags, etc.)
5.) Art Shrines

- Grades 3-8
- Can be whatever topic you choose.
- Provided quotes from books & about books
- Kids have freedom to design their own shrine.
6.) Pendulum Painting

• All ages

• Discuss gravity, motion

• PVC pipe construction to create pendulum paint art.

• Could use with Pendulum Challenge from PBS Kids
7.) Edible Art

• Great for all ages
• Mimic iconic images from famous masterpieces, books, or video games
• More ingredients = More creative art!
8.) **Student Art Showcase**

- Partner with local schools and art teachers to highlight student created masterpieces
- All ages! Great holiday program!
- Students gain experience with selling works.

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Hey girl, what's your sine?

It must be pi/2 because you are the 1

8 Mega MATH Programs...
1.) Pi Day

- Middle & High School
- STEAM Components:
  - Math
- *How I wish I could calculate pi!* to remember the first seven numbers of pi: 3.141592
2.) Candy Casino

- Middle & High School
- Poker & Blackjack
- Learning about odds, probability, addition
3.) Gold Rush

- Grades K-5, but could work with Middle School
- Supply & Demand, Measurements, Inflation
- Pan for gold and determine how much money you made
4.) Mario Party

• All ages, but best with middle school
• Teens form teams, 2-3 players, and move along Monopoly-like board
• Compete in mini-games focused on learning how to invest money to gain net worth.
5.) Life-Size Life

• Middle & High School

• Re-create a Life game board in the library.

• Teens learn about budgets, real life decision-making, how loans work.

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6.) Who Wants to be a Millionaire?

• Middle and High School
• Team trivia challenge
• Debunking myths about the education, lifestyle, and financial behaviors of the wealthy.
• Partnered with NKU’s Center for Economic Education
7.) Financial Football

• New App
• Soccer available
• Lesson Plans for K-12
• Financial Football features questions of varying difficulty throughout the game. Like football, successful financial management requires strategy, finesse and endurance.
• www.moneysmartweek.org
8.) Choconomics

- Great for class visits
- Best with Middle School
- Concepts:
  - Addition, Subtraction
  - Multiplication/Division
  - Scarcity
  - Fair Trade
  - Economics
Beyond 40 Programs: Family Programming

• Family Festivals:
  – Quartlery
  – Drop-in Stations
  – STEAM Themes
• Money Matters Meal Night
• Lego Club
• Makerspace
• Teen Tech Team

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For more resources...

SLJ STEAM Pinterest Board

http://www.pinterest.com/sljournal/steam/

Design Squad Nation

http://pbskids.org/designsquad/
Questions?

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I talked about the survival of the fittest
Before the Hunger Games