Collaboration

*Design-driven Professional Development: Educators as Engineers*

Mike Perkins at Cornell

American Association of Physics Teachers, 2012

Lora Hine at Tully ES
Background Information

• Cornell Laboratory for Accelerator-based Sciences and Education (CLASSE) funded by NSF - Broader Impacts - funds two full time outreach folks (Erik Herman)

• SUNY Oneonta Science Education Education Prof. Leanne Avery
  - Strong lobbyist for STEM in rural schools

• Tully Central School District
  Mike Perkins
  - Science & Math
  Mary Podseidlik
  - Art & Enrichment

• Space Science
  – NASA (Nancy Schaff)

• Many others!

Wilson Synchrotron Laboratory - particle accelerator & x-ray light source

Students, teachers & collaborators tour the underground tunnel
Connections

- Connect teachers to resources at Cornell
  - Interactions with scientists
  - Use engineering/technology
  - Tours of research facilities

- Touring Fenner Wind Farm
- Accelerator tunnel and complex
- Energy Recovery Linac Prototype
- Touring Nona-Fabrication Facility
- Cornell’s Hydroelectric Plant
- Laboratory for Ornithology
- Gamelan – East Asian music and instruments
Connections

• Connecting teachers to materials, ideas and techniques
• Professional growth via:
  - Teacher-teacher & networking
  - Facilitating dialogue
  - Skill-building emphasis
  - Engineering Design Process
  - Project-based Learning

- Building solar-powered race cars
- Making homemade generators
- Testing blade & wind turbine designs
- Taking electrical measurements w/multi-meters
- Learning soldering techniques
Classroom Connections

- Cornell Summer Science Snapshot! Two-day summer camp

Program overview
- Design-based Learning
- “Junior Engineers”
- Team-work
- Tours of Cornell
- Showcase Event

Big Picture
- Enjoy themselves
- Exposure to what scientists & engineers do
- Envisioning themselves in this context

“I am a firm believer that education not be from a textbook or inside four walls. It needs to be hands-on like this program in order to resonate. Getting a program like this into mainstream curriculum is key; it engages the senses” – Parent of Tully Middle School participant
My Experiences with Cornell

• 2008 – Space Science Workshop (Nancy Schaff)

• 2009 - Summer Science Workshop EIE and the engineering process (CLASSE)

• 2010 – Summer Science Snapshot (Sound) and Rural Science Workshop (CLASSE)

• 2011 – Summer Science Snapshot (Energy) and Rural Science Workshop (CLASSE)
What Cornell has provided to Tully Central Schools

• Space Science workshops for teachers 2008 and 2011 with Nancy Schaff.
• Physics workshops for teachers 2009-2011
• Summer Science camp opportunities for 20+ Tully students grades 5-7, 2010-2011
• Connection to Cornell scientists / educators
• Field trips
• Curriculum and materials
Our Focus

The Goal

Imagine
Plan
Create
Improve
Ask
Integration of Science & Engineering

- Tully S.T.E.a.M Team
- Enrichment Courses
- Floating Classroom
- Connecting Arts and Sciences
- Cornell Science Snapshot

Bernoulli Ball extravaganza

Saturday STEAM preparations for Tully Showcase event

Hovercraft demonstration
Students as Engineers – Project Design
Vision for the Future

• Summer Science Snapshot 2012
• Rural Science Workshop
• Geology Connection
• New Vision for S.T.E.a.M.
• Reach more teachers (Tully and beyond)
• Distance Learning (connecting students, scientists, and teachers)

Challenges:
• Continuation of work with multiple grade level teachers at the same small district – hard to implement with best intentions
• Budget cuts & limited funding – minimal field trip opportunities
• Integration of modeled teaching activities in the actual classroom is not a seamless process!
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Kraig Pritts - TullyCentral School District Superintendent

Boston Museum of Science - Engineering is Elementary curriculum

Shawn Reeves – EnergyTeachers.org