# Discovering Physics through a Tanzania Engineering Problem

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# Background

- Fulton County Schools
  - Westlake High School Math/Science Magnet Program
  - Creekside High School STEM Academy
- Georgia Institute of Technology
  - Center for Education Integrating Science Mathematics and Computing (CEISMC)
  - Center for the Enhancement of Teaching and Learning (CETL)
- Engineers Without Borders

# UAACC

## (United African Alliance Community Center)

- Located in the Imbaseni Village in Arusha, Tanzania
- Started in 1992 by an African American husband and wife
- Recently received 16 orphans
- Offers classes for youth and adults
- Offers classes in English, art, music, history, health and nutrition, HIV awareness, and basic computer skills


# The Problem

- The electrical grid goes down daily at different times in the Imbaseni Village for anywhere from 2-5 hours
- The computer classes lose instruction time just about every day
- UAACC has a diesel generator but seldom uses it because of cost for fuel

# Circuit Training

- Make the battery light the light
- Measure and record the voltages across the
  - Battery
  - Light

- Add in the resistor in your bag to the circuit and measure and record the voltages across
  - Battery
  - Resistor
  - Light
- Be ready to discuss your results and why you think you have those results

# UAACC Computer Lab Specs

- See Handout
- We will use
  - Batteries to represent the solar panels
  - Resistors to represent the Computers

- Put together a circuit to represent your engineering design solution for the UAACC
- Additional solar panels (batteries) and computers (resistors) are available in front to test your design
- Be ready to explain the
  - engineering tradeoffs behind your design
  - scientific principles of your design and
  - economic decisions of your design

# Engineers Without Borders

•Westlake High School inducted the first and only high school chapter of Engineers Without Borders in the country in March of 2007.

•The chapter went to Tanzania in July 2007 to train students there in a solar cooking engineering project and will ship a solar power generator in July 2010.

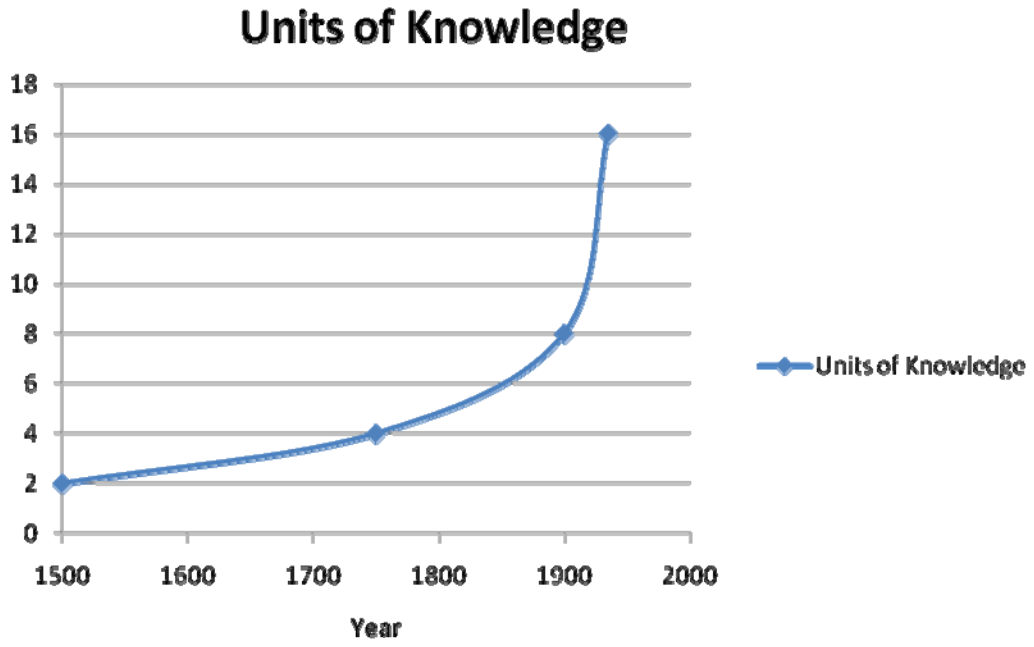
# *Why Inquiry Engineering?*

Sponsored by the US Department of Transportation

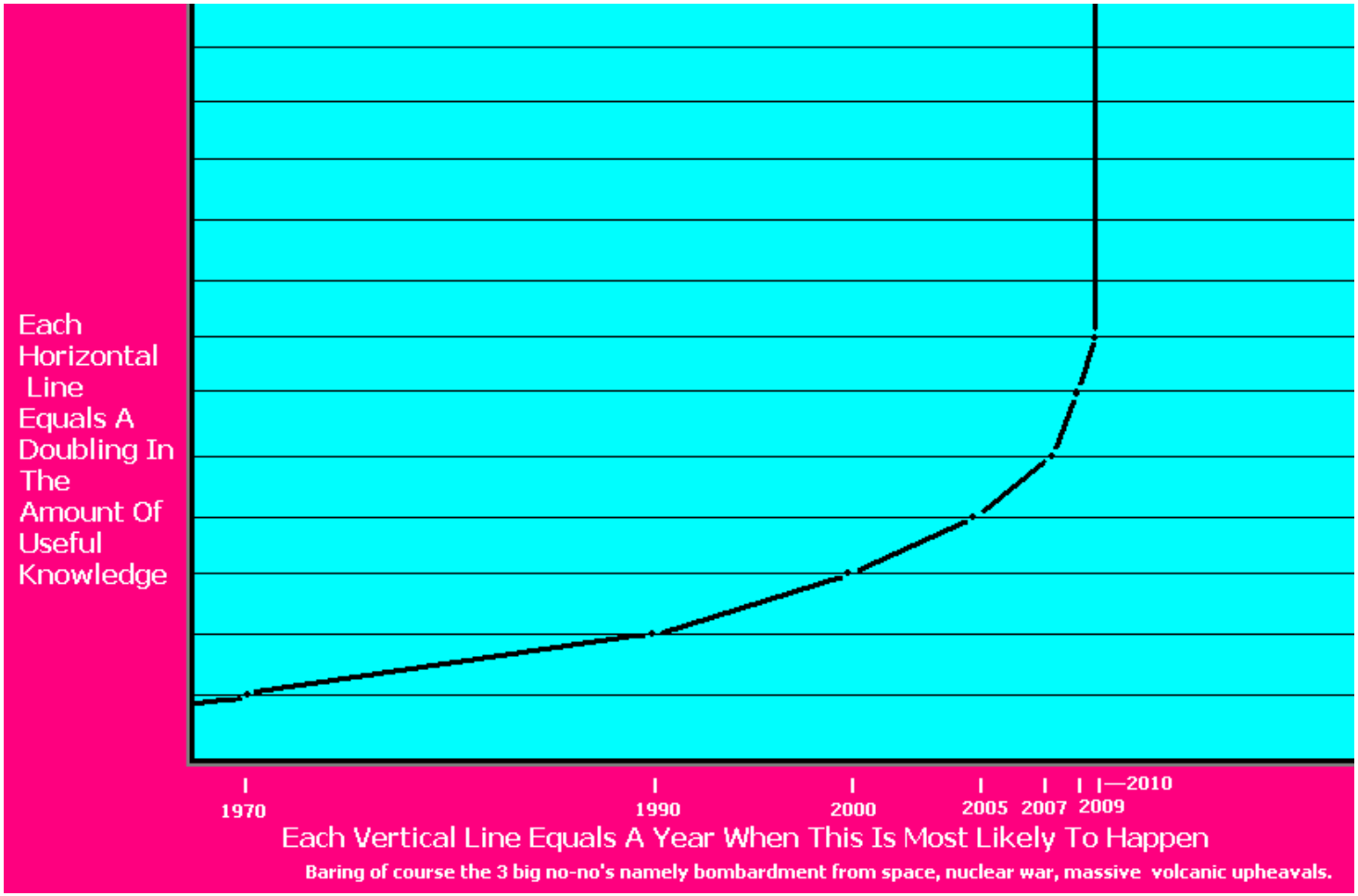
Fulton County Schools and

Georgia Institute of Technology

# How fast has Knowledge Doubled?



# If Knowledge Increases Like This, Then…

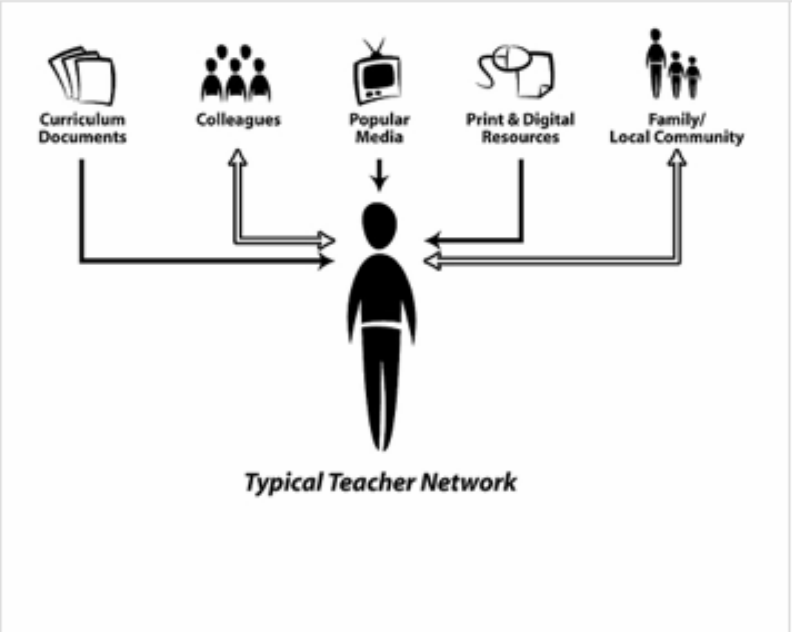


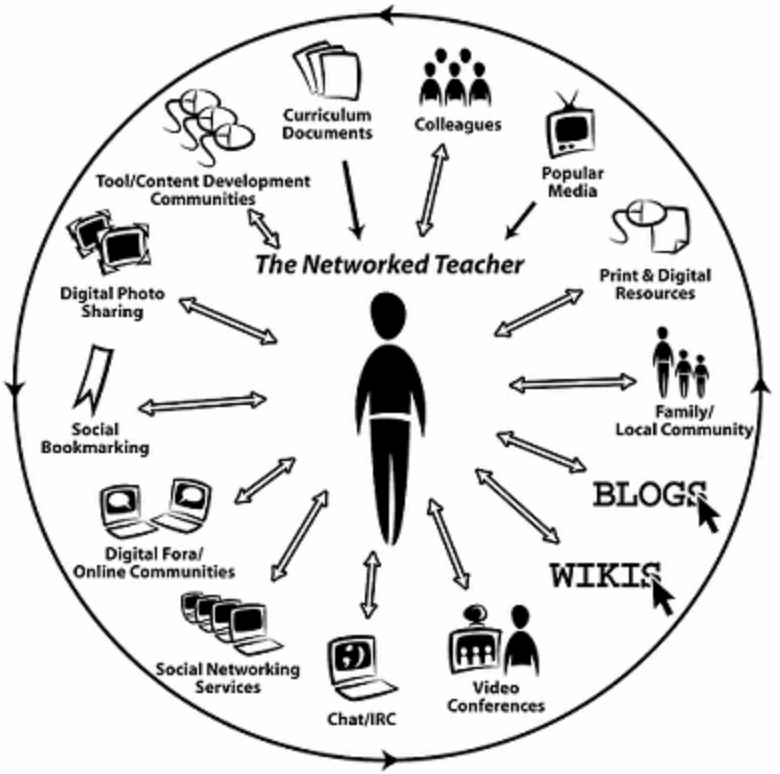

Based on so much to know what should students learn?

# What's this mean for the 21st Century Learner & Teacher?

http://jackiegerstein.wikispaces.com/Trends+for+21st+Century+K12+Education

What's missing from the Typical Teacher Network?

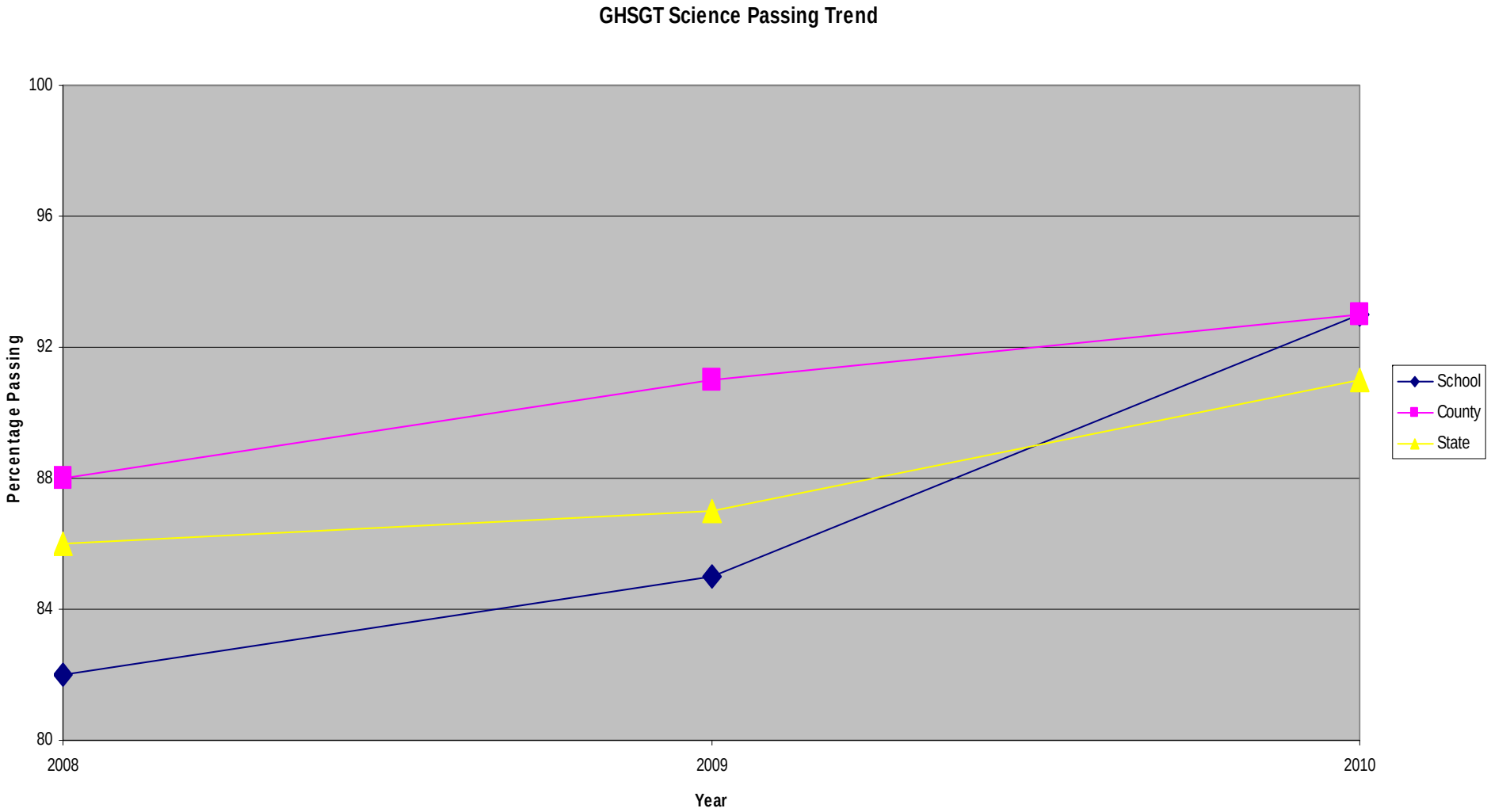


# How should we begin Inquiry?
## Seymour Papert – MIT Professor

- "We teach numbers, then algebra, then calculus, then physics. Wrong!" exclaims the Massachusetts Institute of Technology mathematician, a pioneer in artificial intelligence.
- "Start with engineering, and from that abstract out physics, and from that abstract out ideas of calculus, and eventually separate off pure mathematics.
- So much better to have the first-grade kid or kindergarten kid doing engineering and leave it to the older ones to do pure mathematics than to do it the other way around."

# What has Inquiry done for Science Graduation Test Scores at Creekside



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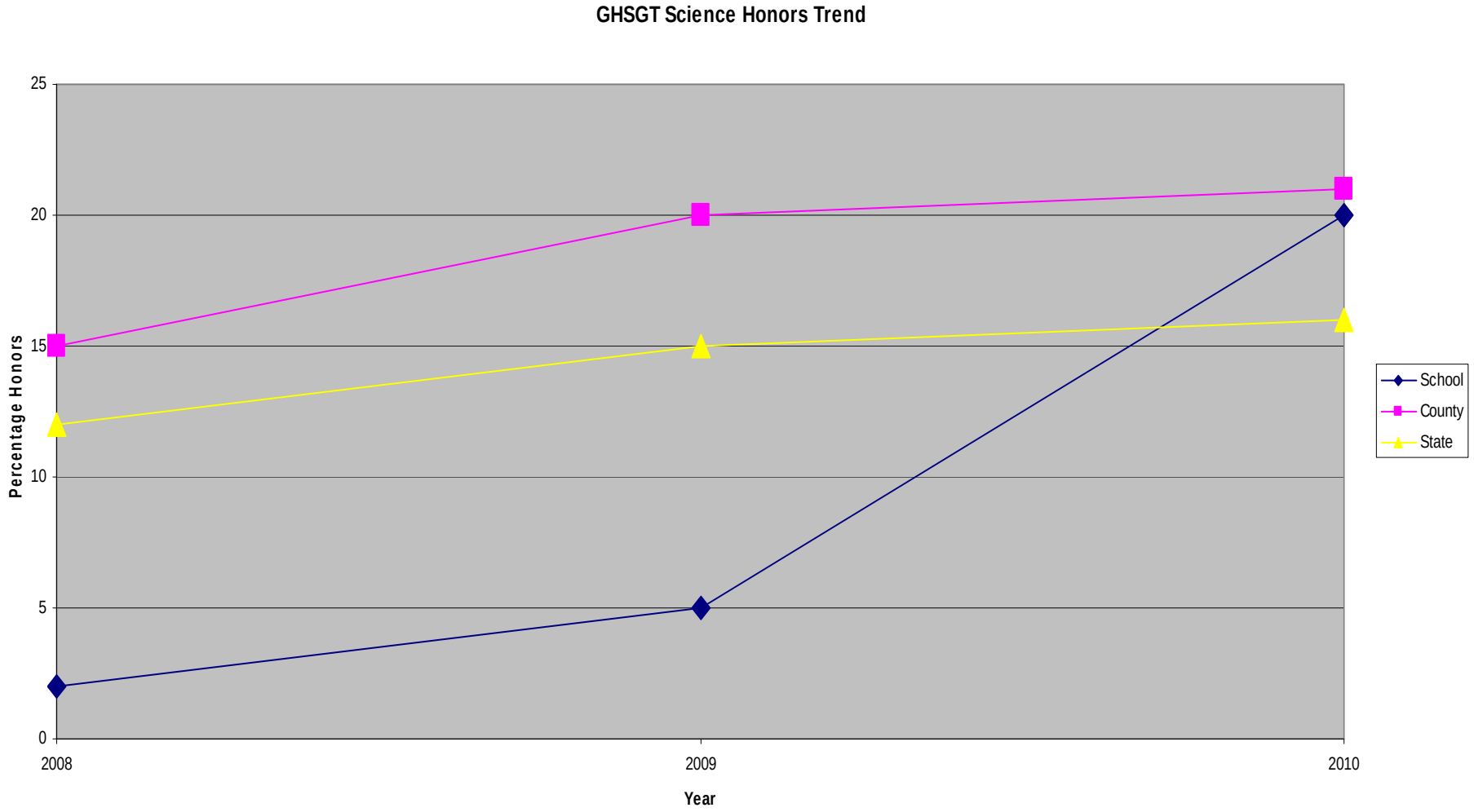

# Presentation Resources

- www.creeksidesummer.webs.com