Why is C.A. Gray implementing STEM?

-We want to **prepare** students to be proficient in STEM subjects and **inspire** them to pursue STEM careers.

Prepare = Skills development

Inspire = Motivation, collaboration, and experiences that peak students' interest

http://blogs.kqed.org/mindshift/2013/08/how-to-get-your-school-ready-for-stem-this-year/

"Students are being given 'nouns' in the classroom when they're looking for 'verbs'."

What type of STEM program will C.A. Gray implement?

-Our long-term goal is to implement a STEM program that will lead to Georgia STEM School certification

-Our short-term goal is to become a stem-focused school in which every student participates in a STEM curriculum in all subject areas, engages in STEM competitions, participates in STEM field trips and extended learning experiences, and identifies with STEM careers of interest.

How will C.A. Gray prepare and support teachers? What do teachers know/need to know, and how will they learn it?

-Ongoing content specific teaching and learning strategies

-STEM education PLUs in-house beginning January 2014

- 21st Century Thinking and Learning Skills

-National Educational Technology Standards for Students and Teachers

-Engineering Design Process

-STEM curriculum development

-Business, industry, and post-secondary educational partnerships

-STEM field trips and student competitions

What are Grand Challenges?

A grand challenge is a specific critical barrier that, if removed, would help solve an important problem in the developing world, with a high likelihood of global impact through widespread implementation.

The Grand Challenges to Engineering of the 21st Century:

1. Make solar energy economical
2. Provide energy from fusion
3. Develop carbon sequestration methods
4. Manage the nitrogen cycle
5. Provide access to clean water
6. Restore and improve urban infrastructure
7. Advance health informatics
8. Engineer better medicines
9. Reverse-engineer the brain
10. Prevent nuclear terror
11. Secure cyberspace
12. Enhance virtual reality
13. Advance personalized learning
14. Engineer the tools of scientific discovery

Why are we doing Grand Challenges?

To train students in skills necessary for college and career readiness.

To give students experiences that will develop a problem-solving mindset.

To help students see themselves as citizens of the world.

To expose students to rigorous instruction in order to build skills for advanced studies.

To train students in 21st Century Skills.

To equip students with vital technology literacy skills for learning and creating.

To inspire student interest in STEM-related occupations.

To show students real-world job possibilities.

http://www.whitehouse.gov/administration/eop/ostp/grand-challenges

What is STEM?

-The acronym stands for Science, Technology, Engineering, Mathematics and **STEAM** includes ARTS

-Began in 2001 by Judith A. Ramaley

-A teaching philosophy that treats science, technology, engineering and mathematics as being interrelated and integral to teaching any subject area.

-A student-centered curriculum that focuses on problem-solving, discovery, exploratory learning, and active engagement in a situation in order to find its solution (inquire, think, investigate, innovate)

- **A common definition of STEM:** An interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy (Tsupros, 2009).

http://www.currtechintegrations.com/pdf/STEMEducationArticle.pdf

What are 21st Century Skills?

250 researchers across 60 institutions worldwide categorized 21st-century skills internationally into four broad categories:

-Ways of thinking: Creativity, critical thinking, problem-solving, decision-making and learning

-Ways of working: Communication and collaboration

-Tools for working: Information and communications technology (ICT) and information literacy

-Skills for living in the world: Citizenship, life and career, and personal and social responsibility

Two skills that span all four categories:

-Collaborative problem-solving. Working together to solve a common challenge, which involves the contribution and exchange of ideas, knowledge or resources to achieve the goal.

-ICT literacy (learning in digital networks). Learning through digital means, such as social networking, ICT literacy, technological awareness and simulation. Each of these elements enables individuals to function in social networks and contribute to the development of social and intellectual capital.

-We will teach our students collaboration, cooperation, communication, creativity, organization, problem solving, self-direction, social responsibility, and technology fluency

http://www.p21.org/our-work/p21-framework

"The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, un-learn and relearn. Those who can un-learn and relearn are the leaders for tomorrow."

What is the Engineering Design Process?

-The **engineering design process** is the set of steps that a **designer** takes to go from first, identifying a problem or need to, at the end, creating and developing a solution that solves the problem or meets the need. Engineers are problem-solvers.

What are the steps in the engineering design process?

-Identify a need. (Define a problem and do background research.)

-Plan, design, and create a solution.

-Test, evaluate, and refine.

-Communicate processes and results.

Our Vision: C.A.Gray Jr. High School will become a School of Excellence.

Our Mission: C.A.Gray Jr. High School's mission is to provide a community of supports to ALL students, ensure a safe learning environment, and equip ALL students with strategies for a successful transition beyond the Jr. High Level.

What will we do about STEM curriculum?
In year one, we will examine the online free resources listed below to identify appropriate curriculum support and to decide if we need to purchase curriculum. The most highly recommended online resources are the Siemens STEM Academy and the PBS STEM Resource Center.

12 Steps to Great STEM Lessons
- http://www.middleweb.com/4328/12-steps-to-great-stem-lessons/

Siemens STEM Academy – Lessons, videos, webinars, professional development, Top 10 STEM Resources
- http://www.siemensstemacademy.com/
- http://stem.discoveryeducation.com/index.cfm?event=showResource&resourceId=e6b5a8ea-1321-0c71-3c37-b7215fe415d4

STEM Careers
- http://stemcareer.com/videos/

National Science Digital Library
Search for just about anything in every subject
- http://nsdl.org/

PBS Stem Resource Center
- http://www.pbs.org/teachers/stem/

National Education Association (NEA) Top 10 STEM Resources
- http://www.nea.org/tools/lessons/stem-resources.html

Educational Technology Guy
STEM curriculum and content-based resources
- http://educationaltechnologyguy.blogspot.com/p/stem-science-tech-engineering-math.html

Research-based STEM curriculum and Programs:
- Understanding by Design & Defined STEM Jay McTighe and Dave Reese
  http://www.definedstem.com/home/index.cfm?enc=ZT1QbGVhc2UlMjBsb2clMjBpbiUyMGFnYWluJTJFJTIwWW91ciUyMHByZXZpb3VzJTIwc2Vzc2lvbiUyMGhhcyUyMGV4cGlyZWQlMkUmcGFnZVJlcXVlc3RlZD0vaW5kZXguY2ZtJg%3D%3D
- Project Lead the Way (PTLW)
  http://www.pltw.org/

Florida Center for Research in Science Technology Engineering, and Mathematics FCRSTEM at Florida State University
http://www.fcrstem.org/
http://stem.fsu.edu/

Confirmed STEM Partners:
Sanderson Farms
Mr. Beau Sherman (CNS & Georgia Tech)
Valdosta State University
Colquitt Regional Medical Center (CRMC)
Mr. Kareem Council, CCRMC Employee & Medical Student