The Challenge is that often Engineering is NOT explicitly in the Curriculum

But Engineering is fact the Glue

Grand Challenges in K12 Education
Continuation of Life on the Planet making our world more Sustainable, Safe, Healthy and Joyful
Advance Personalized Learning
Enhance Virtual Reality
Engineer Better Medicines
Restore and Improve Urban Infrastructure
Provide Access to Clean Water
Manage the Nitrogen Cycle
Develop Carbon Sequestration Methods
Prevent Nuclear Terror
Make Solar Energy Economical
Reverse Engineer the Brain
Advance Health Informatics
Provide Energy from Fusion
Engineer the Tools of Scientific Discovery
Secure Cyberspace
Grand Challenges for Engineering (GCE) are ideal as a Coherent Theme for K-12 Instruction.

- Cross disciplinary
- Motivation
- Context
- Societal Connection
- Creativity
- Relevance
A Wide Spectrum of Opportunities

**High Schools**

GCE as an instructional focus that extends through All subjects and through All 4 years

- e.g. Wake STEM Early College High School; Raleigh, NC

A Learning Community within a School

- e.g. Global STEM Challenges Program at Edison High School; Fairfax, VA

A STEM Lab Pathways framed around GCE’s

- e.g. Tesla STEM High School; Redmond, WA
A Wide Spectrum of Opportunities

Middle Schools and After School Programs

GCE in a daily research core class, each grade focusing on different challenges: 6-Water, 7-health, 8-Solar

E.g. STEM Academy at Bartlett Middle, Savannah, GA

Competitions

E.g. Annual competition on themes based on the Grand Challenges (2017 theme is “Engineering the Environment”)

Summer programs

E.g. SEEK (Summer Educational Experience at Kent)
• Program and *experiences* that prepare students (and others) for problems like the Grand Challenges

• 5 “competencies” of GCSP program:
  – *Research/creative* – solution or project experience on GC like topic
  – *Multidisciplinarity* – understanding through hands-on experience
  – *Business/entrepreneurship* – viable business model for implementation
  – *Multicultural* understanding – through global experience
  – *Social consciousness* - through service learning and outreach activities
Partnering with a University with GCSP

- Grand Challenges Scholars as mentors for K12 students
- Grand Challenges Scholars as TA’s for teachers for delivering lessons on Grand Challenges