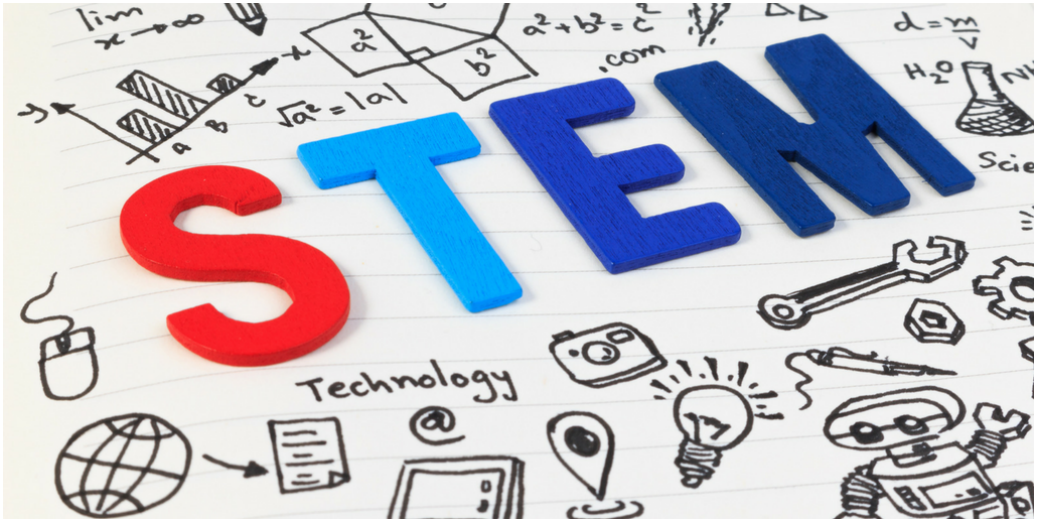
"STEM Challenges Using STEM Literature"



https://blog.edx.org/start-stem-career-six-science-courses

Student Reading Council Meeting

Tuesday, March 27, 2018

6:00 – 7:00 p.m./Buzzard 2160

EIU Student Reading Council

Our website has information about the SRC, upcoming meetings/events, resources from past meetings, contact information, and information about joining the SRC.

http://www.eiu.edu/~reading

Please see Mrs. Reid/Dr. Harrison if you are interested in being an officer for the Student Reading Council.

Similarities and Differences

Next Generation Science Standards (NGSS)

Scientific Inquiry	Engineering Design
Ask a question	Define a problem
Obtain, evaluate and communicate technical information	Obtain, evaluate and communicate technical information
Plan investigations	Plan designs and tests
Develop and use models	Develop and use models
Design and conduct tests of experiments or models	Design and conduct tests of prototypes or models
Analyze and interpret data	Analyze and interpret data
Use mathematics and computational thinking	Use mathematics and computational thinking
Construct explanations using evidence	Design solutions using evidence
Engage in argument using evidence	Engage in argument using evidence

Adapted from A Framework for K-12 Science Education (NRC, 2011)

What is STEM

"STEM is a way to develop the skills essential for critical thinking, problem solving, creativity, innovation, communication, and collaboration."

Characteristics of Quality STEM Programs

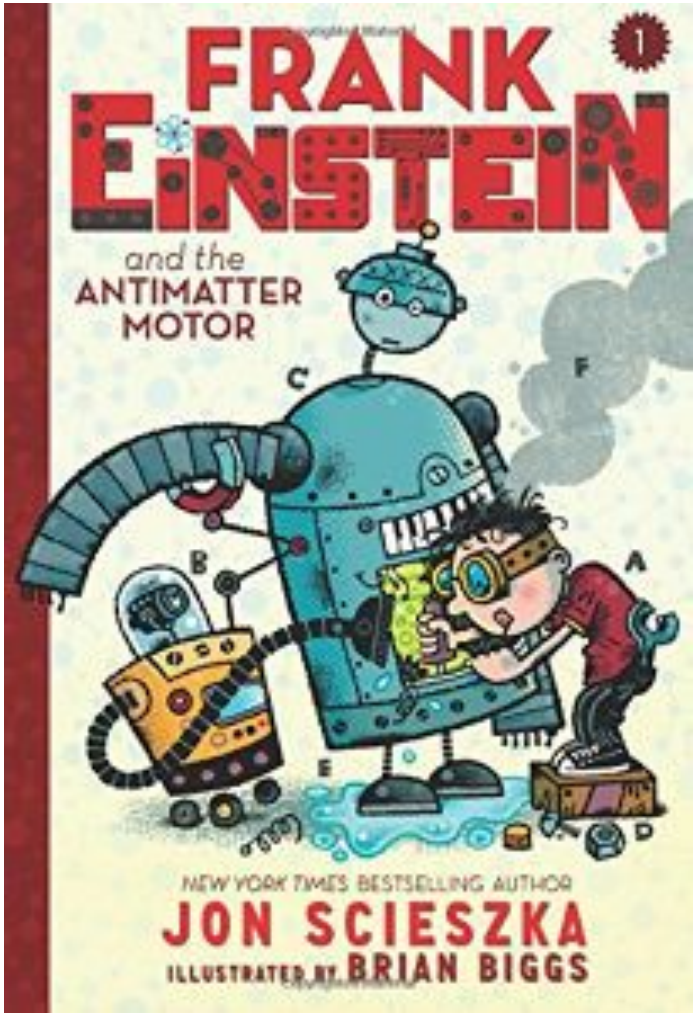
- Context is motivating, engaging, and real world.
- Students integrate and apply meaningful and important mathematics and science content.
- Inquiry based and student centered.
- Solve engineering challenges using an engineering idea.
- Teamwork and communication

(p. ix, Froschauer, 2016)

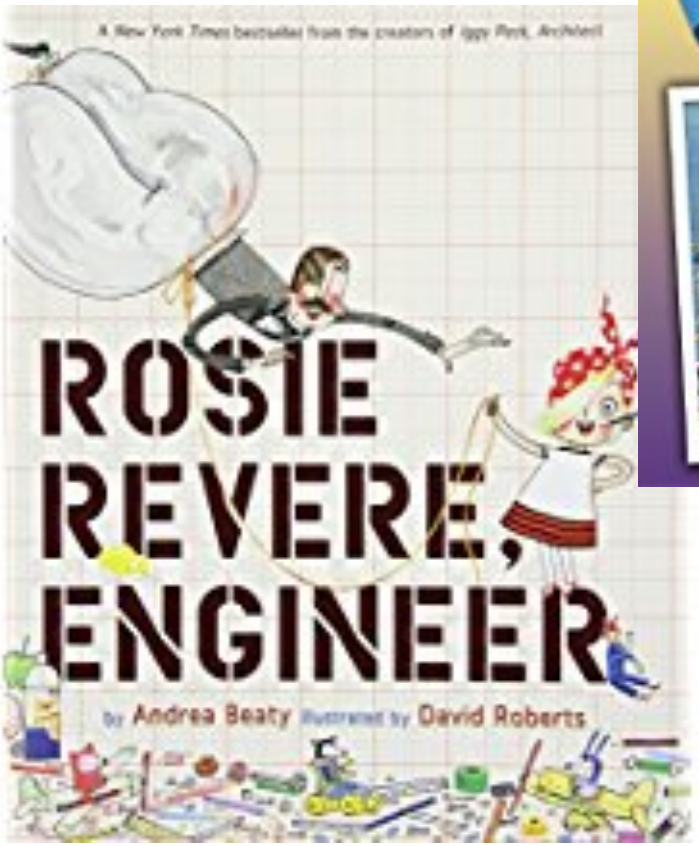
STEM Lessons & Books

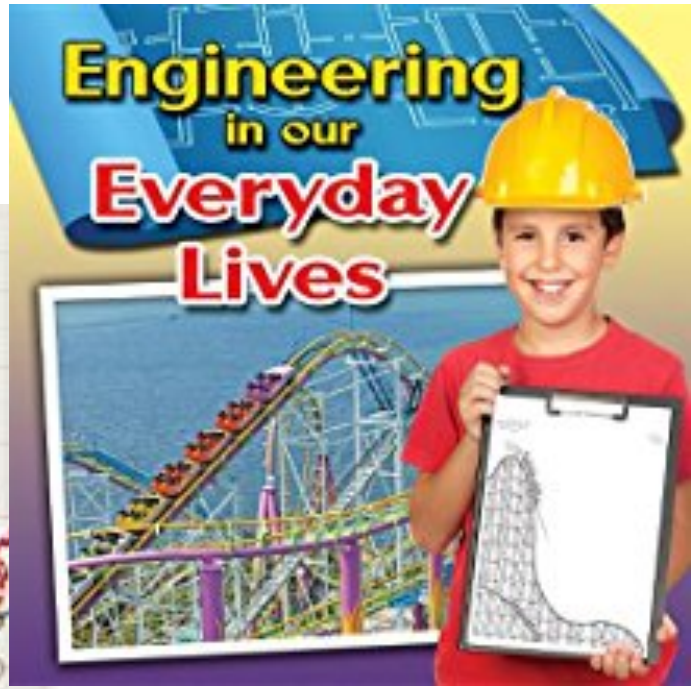
- *Science & Children* is a journal published by the National Science Teachers Association http://www.nsta.org
- Many of the ideas and books presented are from the Teacher Resources section, Teaching Through Trade Books.
  - Two books are featured each month
  - There are two lessons, Grades K-2 and Grades 3-5
  - The lessons follow the 5E Model (Engage-Explore-Explain-Elaborate-Evaluate)
  - Aligned with the NGSS & CCSS

Frank Einstein & The Antimatter Motor

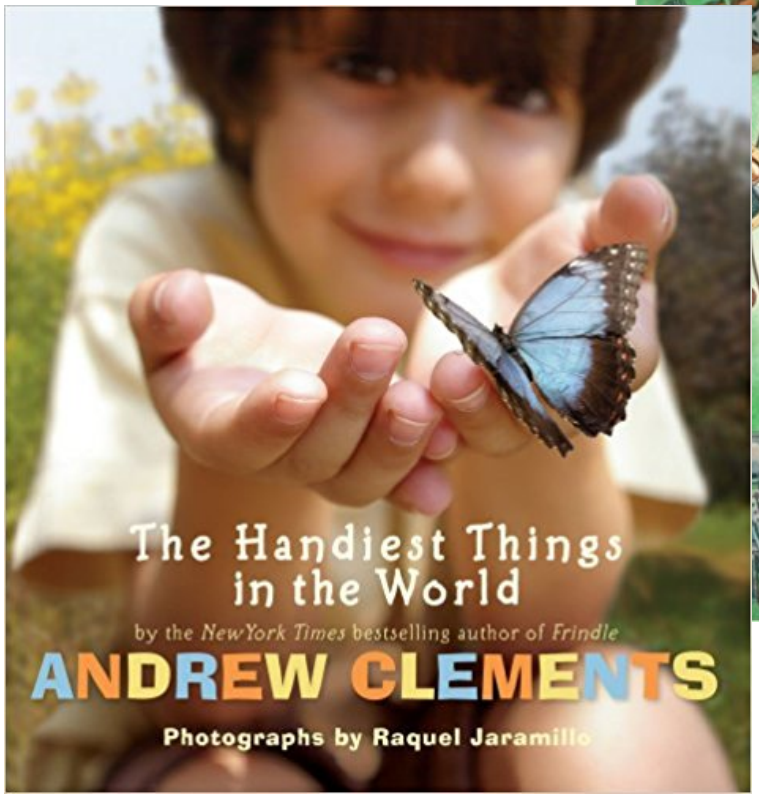


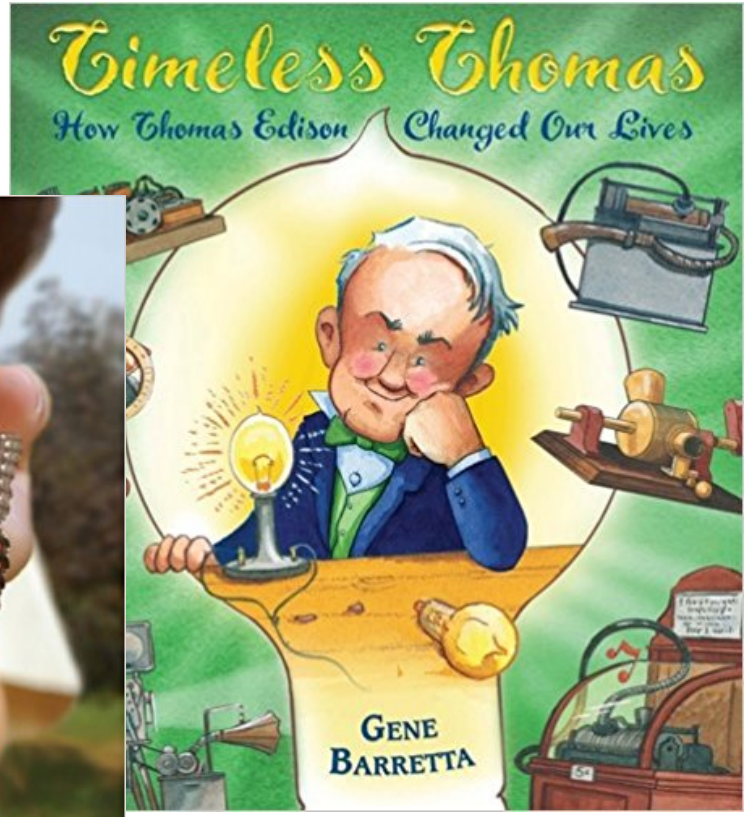
Every Part Has a Purpose





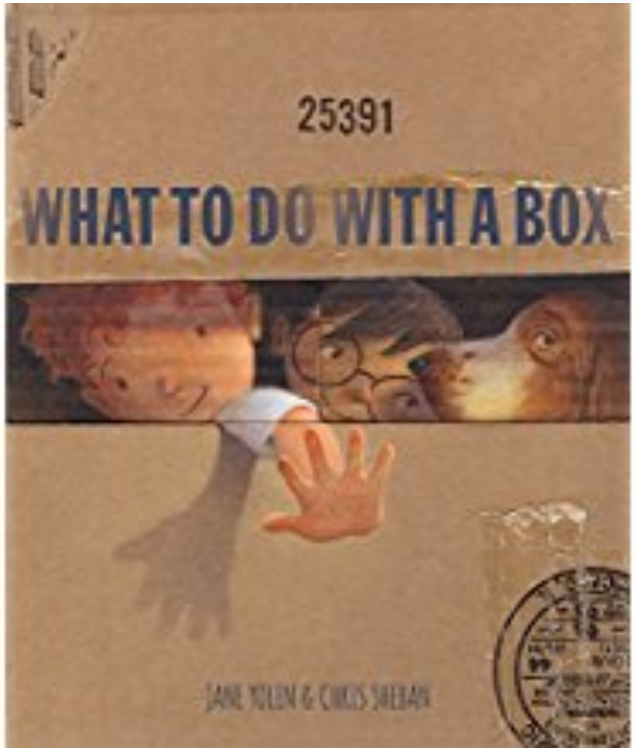
The Stealth Profession





Design Dilemmas

What We Do With Ideas



Engineering Activity: Using Learning Cycle Model

Engage & Explore

- Use the following materials to create a car that moves with a breath of air. (criteria)
  - four Life Savers, two straws, two paper clips, scissors, tape, and a sheet of paper (constraints)
  - Power Source: You

Explain

- Which cars went the furthest?
- What were some of the features that made the cars go further?
- Engineers redesign (make changes) to their improve the design.
- How could your improve your car?
- What other power sources could you use?

Resources

Englehart, D., Mitchell, D., Albers-Biddle, J., Jennings-Towle, K., & Forestieri, M. (2016). *STEM play: Integrating inquiry into learning centers.* Lewisville, IN: Gryphon House.

Froschauer, L. (2016). *Bringing STEM to the elementary classroom.* Arlington, VA: NSTA Press.

Moomaw, S. (2013). *Teacing STEM in the early years: Activities for integrating, science, technology, engineering, and mathematics.* St. Paul, MN: Red Leaf Press, Inc.

Morgan, E. & Ansberry, K. (2017). *Picture-perfect STEM: Lessons, 3-5, using children's books to inspire STEM learning.* Arlington, VA: NSTA Press.

Vasquez, J.A., Comer, M., & Villegas, J. (2017). *STEM lesson guideposts: Creating STEM lessons for your curriculum.* Portsmouth, NH: Heinemann.

Teaching Through Trade Books Articles are found in *Science and Children*, journal published by NSTA. (The articles presented can be found at http://castle.eiu.edu/~reading/docu.html)

Other Engineering Challenges

- PBS Building Big Website
  - http://www.pbs.org/wgbh/buildingbig/
- The Spaghetti Challenge
  - http://www.sciencemuseum.org.uk/educators/teaching_resources/activities/spaghetti_challenge.aspx
- Spaghetti Tower Instructions
  - http://kats.org/wp-content/uploads/2014/07/Spag_towers_instructions.pdf
- Pasta Cars
  - http://stem-in-motion.wikispaces.com/Pasta+Car+Challenge
- Tall Tower Challenge
  - http://tryengineering.org/lessons/tower.pdf