Get to the Other Side: Designing Bridges

Using EiE to integrate an innovative engineering design

Kathy Kennedy – Stevens Institute
Carolyn McLain – Morris School District
Introduce concepts of technology and engineering
Develop an understanding of how to use EiE materials

Engineering Story
Engineering Field Overview
Engineering Design Process
Testing to inform Engineering Design
Engineering Design Challenge
Engineering Story

- Incorporates literature.
- Written from a child’s perspective.
- Introduces a study of engineering, the Engineering Design Process, and vocabulary.
Engineers use science, math and creative thinking to solve problems or design things.

Civil Engineers design, build, supervise, operate, and maintain construction projects and systems, including roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment.

ASCE Youtube video “What Do Civil Engineers Do?”
https://www.youtube.com/watch?v=cJaRjI7K-Lw
The Engineering Design Process

Imagine

What are some solutions?
Choose the best idea.

Ask

What is the problem?
What have others done?

Create

Build my design.
Test it out.

Plan

Draw a diagram.
Decide what materials I will need.

Improve

How can I make my design better?
Try again!

The Goal
Testing to inform Engineering Design

Lesson 2 - Forces: the pushes and pulls on the structure from gravity and wind.

   Extension: test various column shapes and/or sizes

Lesson 3 - Understanding Bridging

   Students test the strength of various bridge types (beam, arch, and deep beam)

* Bridge failure is not always a complete collapse.
What are some reasons for having a bridge? Are all bridge designs the same?

Beam

Suspension

Arch
Bridge Failures
Engineering Design Challenge

- Build a bridge that rests on 4 ½ inch abutments and spans 15 inches.
- A 3x3 inch truck or boat must pass underneath.

Scoring Criteria:
- Cost
- Strength
- Stability (car successfully rolling across the bridge)
Additional Resources

Three Billy Goats Gruff picture book

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PBS Kids Design Squad http://pbskids.org/designsquad/

  Suspension Bridge
  http://nj.pbslearningmedia.org/resource/lsps07.sci.phys.maf.dssuspension/design-squad-suspension-bridge/

  Truss Bridge
  http://nj.pbslearningmedia.org/resource/lsps07.sci.phys.maf.dstruss/design-squad-truss-bridge/

NOVA: http://www.pbs.org/wgbh/nova/bridge/
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