Read It, Build It 2.0

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Brought to you By:
Joanie Craddock, Alexandra Schroeder
and Teachers Like You
Why Integrate Literature and Engineering

- Bridge the gap between Language Arts and STEM
- Build in Next Generation Science Standards

“Perhaps surprising, literature has been our biggest STEM integration success due to the fact that literature is such an integral part of the elementary school curriculum and usually teachers have a large block of time for language arts. Literature has the potential to present situations that can challenge students’ imaginations. Stories can serve to encourage students to begin to problem solve, generate design proposals, and make connections to engineering.”

-Blog by Rachel Lynett
Earthquake!

The Project: Design a table like structure that is strong enough to protect what is underneath from falling overhead debris during an Earthquake.

Suggested Materials: Newspaper, masking tape, scissors, lego pieces (something to simulate debris)

NGSS: 4-ESS3-2 and 3-5 Engineering Design
Earthquake! Literature Pairings

A Few Suggested Titles to Compliment this Project:

- The Earth Dragon Awakes: The San Francisco Earthquake of 1906 By Laurence Yep
- Island of the Blue Dolphins By Scott O’Dell
- Earthshakes: Poems from the Ground Up By Lisa Westberg

Reader’s Workshop: Lucy Calkins 4th grade Unit 2 Reading the Weather, Reading the World
Penguin Delivery

**The Project:** Based on the story “Mr. Popper’s Penguins” students will create a working model of an insulated shipping container to hold a penguin. The container must be able to sustain a bag of ice for an hour with minimum melting.

*Modification:* To focus on climate change and it’s impact on animals, students could also be challenged to create a prototype that solves a problem affecting animals (i.e. Problem: Marine animals in an oil spill - create a water filter to create a clean water habitat for those animals.

**Suggested Materials:** See [Project Outline]

**NGSS:** [3-LS4-3 and 3-LS4-4]
A Few Suggested Titles to Compliment this Project:

- *Mr. Popper’s Penguins* by Richard Atwater
- *Hoot* by Carl Hiassen
- *White Dolphin* by Gill Lewis
- *Moon Bear* by Gill Lewis
- *The Last Wild* by Piers Torday
The Project: Build a functional ferris wheel.
*Additional Challenge: Ferris wheel must turn using either wind or water energy.

Suggested Materials: See Project Outline

NGSS: 3-PS2-2 and 4-PS3-4
Ferris Wheel: Literature Pairings

A Few Suggested Titles to Compliment this Project:

- *Charlotte’s Web* by E.B. White
- *Sophie Mouse* by Poppy Green
- *Mr Ferris and His Wheel* by Kathryn Gibbs Davis
- *George Ferris Grand Idea* by Jenna Glatzer

Metaphorical Ferris Wheel – Upper Grade

- *Hope is a Ferris Wheel* by Robin Herrera
The Project: Students construct a bridge that can hold a large amount of weight.

Students can test their bridges in an ultimate bridge showdown! Place increasing amounts of weight on the bridge and see what happens!

*Great Open House showcase

Suggested Materials: Popsicle sticks, hot glue, hot glue guns

NGSS: 3-5 Engineering Design
Bridge: Literature Pairings

A Few Suggested Titles to Compliment this Project:

● Witch of 4th Street and Other Stories by Myron Levoy
● Twenty-One Elephants and Still Standing by April Jones Prince
● Bridge to Terabithia by Katherine Paterson
● Pop’s Bridge by Eve Bunting

Middle School Read:

● Invisible by Pete Hautman
Survival Shelter: Do you have what it takes?

The Project: Students will build a survival shelter in response to a recent natural disaster. The shelter will have to address specific needs that arise because of that specific disaster.

Suggested Materials: Recycled materials

NGSS: 3-LS4-3, 3-ESS3-1, 4-Ess3-2
A Few Suggested Titles to Compliment this Project:

- *Island of the Blue Dolphins* by Scott O’Dell
- *Hatchet* by Gary Paulsen
- *My Side of the Mountain* by Jean Craighead George
- *I Survived: Five Epic Disasters* by Lauren Tarshis
- *Escaping the Giant Wave* by Peg Kehret
  - Peg Kehret writes a series of natural disaster fictional novels
The Project: Using materials of their choice, students need to create a spherical shaped object that can hold 5 marbles and remains positively buoyant.

*For lesson ideas and content check out this resource

Suggested Materials: Plastic containers, plastic wrap, aluminum foil, Tape (various types), etc.

NGSS: 3–5 Engineering Design
A Few Suggested Titles to Compliment this Project:

- *James and the Giant Peach* by Roald Dahl
- *The Cay* by Theodore Taylor
- *Island of the Blue Dolphins* by Scott O’Dell
Holes Made Easy

The Project: Students need to create a digging machine (inspired by simple machines) that will replace the shovel. Students will use this new creation to dig a hole in dirt.
*Project inspired by the novel Holes by Louis Sachar
*Lessons on Simple Machines: National Geographic, Teach Engineering

Suggested Materials: Various recycled materials, wood pieces, pulleys, string

NGSS: 5-PS2-1, 3-PS2-1
Holes Made easy: Literature Pairings

A Few Suggested Titles to Compliment this Project:

- *Holes* by Louis Sachar
- *James and the Giant Peach* by Roald Dahl
- *My Side of the Mountain* by Gary Paulsen
- *Hatchet* by Gary Paulsen
Assessing Building in the Classroom

Engineering is something that can’t be graded with a letter or a percentage.

It is All About the Process

Try using the Mindset Rubric to assess engineering projects
Tip and Tricks: Implementing into the Classroom

- **Plan the time in your schedule**
  - Anticipate time for brainstorming, designing, prototyping, feedback, revision

- **Have materials out and available to students**
  - Think about the traffic flow in your room and where you place materials

- **Try the build yourself or with a few students**
  - Gives you a sense of challenges

- **Cheap way to collect materials**
  - RAFT, Trash for Teachers, ask for parent donations of recycled materials
Your Turn

The Challenge: Build a bridge out of toothpicks and tape for Jess and Leslie to walk safely across to Terabithia.

Materials: toothpicks, tape, scissors

The Test: The bridge must hold 50 grams the distance of 25 centimeters without collapsing at any point. The bridge should be built within the budget.

Student page
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