Where It Stops, Nobody Knows: ELA Through STEM

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The Objectives

• 1. I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
• 2. I can develop and design a STEM challenge by starting with text to form the problem needed solved.
The Process

- Find/Create a STEM Challenge
- Pinpoint a topic of focus
- Search for books that correlate to topic
- Develop lesson plan with standards

Objective 1: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Brainstorming

STEM Challenge:
Where can you get ideas?
• Pinterest
• Google
• TryEngineering.org
• TeachEngineering.org
• AdvancingSTEM.com
  • Create a top to spin the longest amount of time using Zometools.

Topics:
What topics can be tied to the challenge?
• Motion
• Energy
• Centrifugal force
• Toys (tops)
• Time

• Objective 1: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Decision

Book(s):
Where can you find books with the topic?
• *Timing Races: Measuring Time* by Dianne Irving

Common Core Standards:
Where are these located?
• Math
  • 5.NBT.A.1-4
  • 5. NBT.B.7
• Reading
  • RI.5.4
  • RI.5.5
  • RI.5.7

• Objective 1: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Example Lesson

- Read through text and conduct ELA lesson
- Review math content
- Start STEM Challenge

http://content.caboces.org//AMMS_AVAILABLE/331/14/races.pdf

Objective 1: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Challenge

- A spinner company is having trouble getting it right. They need engineers to build a spinner which can rotate the longest without falling over using Zometools.
- Each spinner needs a rotor.
- The spinner can only be spun on one node.
- Time starts when a team member lets go of the rotor.
- Time stops when the spinner completely stops.

Objective 1: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Reflection

• **Engineering Design Process**
  • Ask – Imagine – Plan – Create – Improve
• Discussion of results and process
• **Reflection questions** (writing connections)

• Objective 1: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
Objective 2

I can develop and design a STEM challenge by starting with a text to form the problem needing solved.
The Process

- Choose a book
- Determine problems in book
- Create a STEM Challenge to design a solution
- Develop lesson plan with standards

Objective 2: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Brainstorming

Book:
What book is being used in class?
What ELA content needs covered?
• Chapter books
• Fiction

Problem(s):
What is happening in the story?
• Multiple small problems
• Major problem
• Student discovery

Objective 2: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
## The Decisions

### STEM Challenge(s):  
Which problem to choose?  
- Student choice  
- Teacher choice

### Common Core Standards:  
Where are these located?  
- Math?  
- Science?  
- Social Studies?

- Objective 2: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
The Example Lesson

- Read through text and conduct ELA lesson
  - Sequencing – Theme – Compare
- Discuss problems
  - River – Catching - Cooking
- Start STEM Challenge

Objective 2: I can develop and design a STEM challenge by starting with a challenge and connecting it to ELA.
### STEM Challenge Connected to ELA

<table>
<thead>
<tr>
<th>STEM Challenge</th>
<th>Topic</th>
<th>Book</th>
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</thead>
<tbody>
<tr>
<td>Build a freestanding letter of the alphabet</td>
<td>letter recognition</td>
<td>Albert’s Alphabet by Leslie Tryon</td>
</tr>
<tr>
<td>Design a car powered by a puff of wind or fan</td>
<td>wind</td>
<td>Gilberto and the Wind by Marie Hall Ets</td>
</tr>
<tr>
<td>Build a boat to hold the most weight before sinking</td>
<td>buoyancy, property of materials, density</td>
<td>Who Sank the Boat by Pamela Allen</td>
</tr>
<tr>
<td>Construct a dam to prevent erosion</td>
<td>erosion, animals changing the land, mimicking animal behavior</td>
<td>Twelve Snails to One Lizard: A Tale of Mischief and Measurement by Susan Hightower</td>
</tr>
<tr>
<td>Design a vehicle to go fastest down a ramp</td>
<td>cars, speed, mass</td>
<td>If I Built a Car by Chris Van Dusen</td>
</tr>
<tr>
<td>Build the tallest tower using balloons and tape</td>
<td>properties of materials, volume, air pressure, states of matter</td>
<td>Harvey Potter’s Balloon Farm by Jerdine Nolen</td>
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</table>
| Click, Clack, Moo: Cows That Type by Doreen Cronin | cows want to send a message to the farmer  
Farm animals want to be warm | design a code to send messages using light or sound  
create a model of an insulated building or a blanket to hold in heat |
| The Three Little Pigs or variations | houses keep getting blown down                                                | build a house out of like materials (bricks; index cards, hay: plastic straws, sticks; craft sticks) to withstand a fan |
| Peter's Chair by Ezra Jack Keats | Peter couldn't fit in his chair                                              | build a new chair for Peter that has to hold a specific amount of weight |
| The Snowy Day by Ezra Jack Keats | snow melted in Peter's pocket                                                | create an insulated container to keep ice/snow from melting over a period of time |
| Hatchet by Gary Paulsen       | hard time finding food  
needed water to drink                                                             | trap to catch animals  
container to hold water                                                        |
| Charlotte's Web by E.B. White | Wilbur needs to be saved from being butchered                                | design a web with words  
use technology to create a flyer                                                |
| Holes by Louis Sachar         | Stanley getting stuck in a hole  
keeping the yellow spotted lizards away while digging                         | build a prototype device to help Stanley out of the hole  
design a trap/wall/fence to fend off lizards                                    |
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