Novel Engineering - Taking Novels to the Next Level
What is Novel Engineering?

Short answer- Reading a novel or book then students solve problems in the story with real world solutions.

It provides students with the opportunity to engage themselves in the story. They are reading the text with and authentic purpose. It allows students to use 21st century skills while reading. STEM activities are essential in today’s classrooms. Novel engineering allows this to take place in any setting (ELA, Science or Social Studies). Students must use critical thinking, creativity, communication, collaboration, flexibility, media, information, and technology to complete the task.
How?

- Identify the problem (usually one they identify) You can give them the problem ex. Rapuzel’s escape
- Research solutions
- Design - Engineer the solution
- Present
What they need to know?

• Research Process - Big 6
• How to find good resources
• How to use presentation tools / presentation skills
What the teacher has to do?

- Chose a novel to read aloud
• Provide materials needed
  • Support
  • Provide rubric
• Teach research process
  • Teach the use of presentation tools
What are you going to engineer?
Why did you choose this?

What is your plan for doing this project?
What do you need to know to do it?
What do you need to have to do it?

How long do you think it will take you?

**Project-based Learning Rubric**

*RUBRIC? IF I KNEW HOW TO DESIGN A RUBRIC WOULD I LOOK THIS FRAZZLED?*
<table>
<thead>
<tr>
<th>Level</th>
<th>Content</th>
<th>Conventions</th>
<th>Organization</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Is well thought out and supports the solution to the challenge or question</td>
<td>No spelling, grammatical, or punctuation errors</td>
<td>Information is clearly focused and organized and supported with examples</td>
<td>Multimedia is used to clarify and illustrate the main points</td>
</tr>
<tr>
<td></td>
<td>Reflects application of critical thinking</td>
<td>High-level use of vocabulary and word choice</td>
<td>Information supports the solution to the challenge or question</td>
<td>Format is appropriate for the content</td>
</tr>
<tr>
<td></td>
<td>Hacker goal that is related to the topic</td>
<td></td>
<td>Presentation captures audience attention</td>
<td>Presentation is well-organized</td>
</tr>
<tr>
<td></td>
<td>Is pulled from a variety of sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Is well thought out and supports the solution to the challenge or question</td>
<td>No spelling, grammatical, or punctuation errors</td>
<td>Information supports the solution to the challenge or question</td>
<td>Multimedia is used to illustrate the main points</td>
</tr>
<tr>
<td></td>
<td>Reflects application of critical thinking</td>
<td>Good use of vocabulary and word choice</td>
<td>Presentation captures audience attention</td>
<td>Format is appropriate for the content</td>
</tr>
<tr>
<td></td>
<td>Hacker goal that is related to the topic</td>
<td></td>
<td>Presentation is well-organized</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is pulled from a variety of sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supports the solution</td>
<td>Minor or no spelling, grammatical, or punctuation errors</td>
<td>Project has a focus but might stray from it at times</td>
<td>Presentation does not capture audience attention</td>
</tr>
<tr>
<td></td>
<td>Reflects application of critical thinking</td>
<td>Low-level use of vocabulary and word choice</td>
<td>Information appears to have direction, but the direction is not consistently carried out in the presentation</td>
<td>Presentation is loosely organized</td>
</tr>
<tr>
<td></td>
<td>Hacker goal that is related to the topic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is pulled from a limited number of sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has some factual errors or inconsistencies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Provides inconsistent information for solution</td>
<td>More than 5 spelling, grammatical, or punctuation errors</td>
<td>Content is unfocused and haphazard</td>
<td>Presentation appears sloppy and unfinished</td>
</tr>
<tr>
<td></td>
<td>Reflects apparent application of critical thinking</td>
<td>Poor use of vocabulary and word choice</td>
<td>Information does not support the solution to the challenge or question</td>
<td>Multimedia is overused or underused</td>
</tr>
<tr>
<td></td>
<td>No clear goal</td>
<td></td>
<td>Information has no apparent pattern</td>
<td>Format does not enhance content</td>
</tr>
<tr>
<td></td>
<td>Is pulled from few sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has significant factual errors, misinterpretations</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Name______________________________**
<table>
<thead>
<tr>
<th>SOLVED THE PROBLEM-</th>
<th>2= OKAY (MET Requirements)</th>
<th>!= Did Not Meet Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>This really solved a problem in the book and was really thought out and a lot of research and work went into this project.</td>
<td>Yes- it would solve the problem. It was thought out and would work. It was simple in design and some effort was made.</td>
<td>No it would not solve the problem.</td>
</tr>
</tbody>
</table>

| Construction- | | |
|---------------| | |
| A lot of thought was put into the design and it is evident that great care and time was taken to build this project. | This was constructed okay. It looks nice. | This was put together quickly and does not look appealing. |

| Research Design | | |
|-----------------| | |
| A lot of effort was put in to this design. You can tell a lot of research was done to know how to design this product. It is not a simple design. It may solve several problems. | Some research or background knowledge was needed to design this product. The design will work. It solves one or two problems. | This design only required background knowledge and it is evident that no research was done to do this design. |

2 - Novel Engineering Rubric for Product
Long Walk to Water
Multi-Use Spear
The Steps To Make It

1. Take the stick and shave the bark off it
2. Then stick the tooth in the split until you can't see the grayish-white part
3. Wrap the tooth to the stick and then wrap the cord all the way down the stick, then tie it off
4. Take a strap of a bag or a backpack, then tape one end of the strap on the bottom of the stick then tape the other end just under the 5-10 cord
5. Take two water bottles and tape them on opposite sides of the stick
6. Then take two paper clips and place them at the end of the stick and tape the top part of the paper clip to the end of the stick then hook the net onto both sides of the stick where the paper clips are

What it Does

First of all it is a spear, so you can kill things with it like fish or lions and even defend yourself. Once you kill or find something you could put it in the net. The two water bottles on the side is used to simply hold water. You can even carry it around with the strap across your body.

Why We Made It

We made this because we thought that it can help Salva in Sudan when he was walking with the lost boys. The spear could help them by defending their selves from lions and taking their meat to eat. The spear could also kill fish when they crossed the river and they could put the fish in the net. Plus when they went across the desert they could drink from the water bottles that they filled at the river.
Our Research

First of all, we looked up images about objects we would put on the spear to see if it would work, or fit together. Second of all we used a Webelo’s handbook to review the knot we used to tie the 5-50 cord. Third of all we listened to some of the problems in the book and thought we should fix it. We also found some materials they had in the book and used them.

Water for Nya - School wide fundraiser to buy straws (collaborated with 7th grade)
Now your done
I really hope this will help Salva and Nya’s life and help other life’s in parts of Africa

It was really hard to find a website that was unblocked so I watched some videos of diy water bottle shoes and that’s how I gathered information, and I just used my brain.

3 - Student designed plastic shoes made from a water bottle.
Students designed a natural filtering system for Nya.
The Lorax

- Notes in their notebook
- Notes in Shared space

5 - Collaborate
6 - Their Plan

https://sway.office.com/TqnFxHhu5i9sogQP#content=LR8UklzBLHxAh

7 - Explanation of Product

THERMOELECTRIC GENERATOR
A GENERATOR THAT CONVERTS HEAT INTO ELECTRICITY

By Martin & Joaquin
WHAT IT IS

This smart machine takes in heat and uses it in a special way. It takes it and makes it into electricity that can be used for anything.

WHAT IT SOLVES

• This invention solves the birds problem of not being able to fly, the once-lers problem of no trees, and the problem of bears. The Lorax Problem and the fishes problem.

HOW WE MADE IT

• First we got a big box and cut it to where we could use it. Then we made 6 sheets of duct tape and made it into a box. We also got Styrofoam balls and covered them in duct tape. Then we took some rolls of cardboard and covered the in duct tape to represent pipes for the machine. After that we took string and connected it to the top of the box. The string comes through the top and goes in a cardboard roll that represents a big seed planter and the seeds are crushed up mints.
MARTIALS USED
- 2 Styrofoam balls
- Black String
- Turf
- 2 rolls of duct tape
- Paper
- Big box

WHAT IT DOES
- This will take the smoke and send it through a pipe that leads to a canister. This sucks out the heat and leads it to a thermoelectric generator that converts heat to electricity. This electricity gets sent through wires. The wires lead to electric seed planters that follow a path that leads all around the fields. The seed planters plant the seeds and new trees grow. The smoke would be gone so the trees would grow solving multiple problems.

OUR FINISHED PRODUCT

CREDITS
- Alphabet Energy
- Destiny
- Discovery Education
- The Northwestern University
- The University of Maryland
- We needed to know how thermoelectric work and how we could make a model of them. We also needed to know how it could solve a problem for the Once-ler’s and the Lorax.
8 - Designing a power source to use instead of trees.
9 - 8th Grade - If You Lived in Colonial Times

10 - The seed wheel - Designed to make planting go faster.
11 - Tobacco Drying Wheel
Where to get ideas

- Pintrest

The Three Little Pigs - Let them use a hair dryer to see if it will blow their house down.

Rupunzel - build a tower or something to help her escape

The Gingerbread Man - a bridge or something to get him safely over the river