

The Engineering and Design Process
Engineering Notebook

Name:

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Team Members:

n/a

PROJECT TITLE:

"E" in STEM Major Project, Fall Semester 2024

MREED.IEYMS.Science

Engineering notebook adapted from stem.nasa.gov



INSPIRE - ENGAGE - EDUCATE - EMPLOY
The Next Generation of Explorers

Step 1: Identify the problem

What are you being asked to achieve? What is the goal of this project?

My task is to introduce my students to the engineering process, have them utilize an Engineering and Design Notebook to document their progress, and complete an engineering challenge.
I chose the task: "Design and build a skeletal system for a differently-shaped creature"

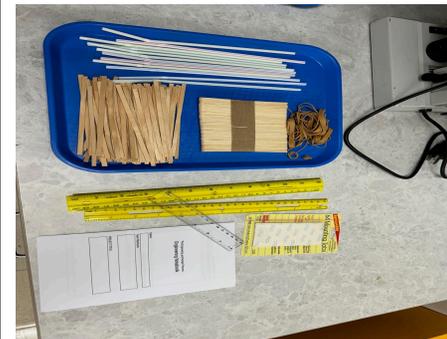
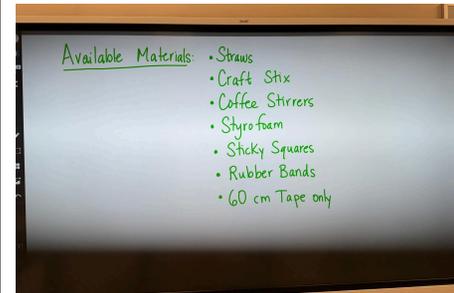
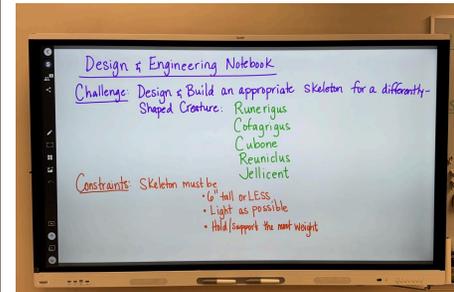
Step 2: Identify Criteria and Constraints

What are the activity's requirements? (perhaps you can find this on the rubric, if you have one)
What will limit your design? (cost, supplies, time, etc.?)

Criteria for this project include documenting my students as they identify the "Problem", brainstorm and design a solution to the problem, build their design with frequent tests, and then evaluate their designs.
The biggest constraint I encountered was fitting this project into the district's curriculum map.

Step 8: Share the design

Be proud of your design and what you achieved! Find a creative way to get the word out about your product and what you have learned.



My students had their own criteria and constraints, plus the opportunity to use an Engineering notebook that I designed!

Step 4: Select a Design

Explain why you chose the final design, and provide a sketch of your winning idea

One of the assignments for the “E” in STEM course was to do a comparative analysis of Design Models. I took inspiration from this assignment to design a foldable “Engineering Notebook” that my students could use to document their process for this project. I arranged it so that it could be printed, folded, and stapled into a “booklet” format,

It has been a useful AND effective tool to not only guide their process but also help them keep track of their progress. They took the steps of the engineering process seriously, and didn’t need to seek assistance from the teacher nearly as often as they usually do.

I found that “Step 3” was the most challenging step, because rather than design a skeleton, they just drew pictures of the creature. They amended this mistake later during steps 7&8.

Step 5: Build a prototype

Step 6: Test and evaluate your prototype

Step 7: Refine your design

You can use this space for any notes. What did you learn in the evaluation step that led to the final design; how did the final product perform?

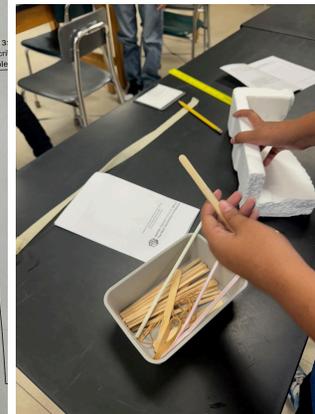
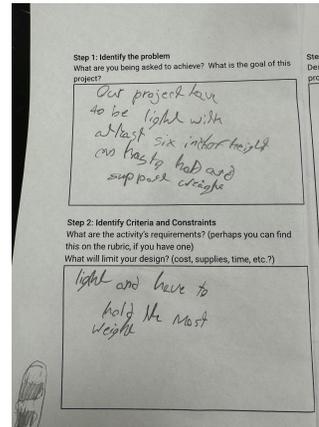
Step 3: Brainstorm Possible Solutions

Describe and sketch possible approaches to solving the problem

I thought it would be helpful for groups to have a bin to corral their supplies during the “build” phase:



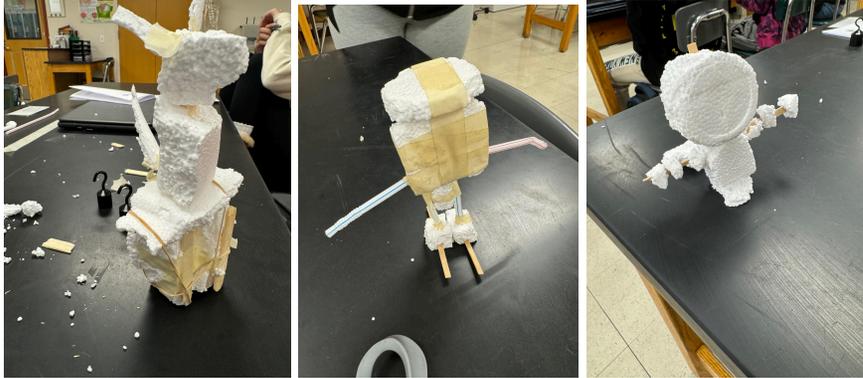
Groups were challenged to build a skeleton that was under 6” tall! They had only select supplies to choose from!



You can see them using their Engineering Notebook and the bins to keep the project organized and well-documented.

Extra Sketch and Notes space:

Here are some photos of my students' designs!



You can see there was plenty of "testing along the way..."

