

**What is the title of your STEM PD?** Classroom Uses for Engineering Design

**Why did you select the topic?** I selected this topic because Engineering Design is one of the main concepts that I teach in my STEAM Lab. I am very familiar with this and feel comfortable discussing how it can be incorporated into core subject areas.

**How does your PD integrate NASA assets and/or content from the Endeavor courses?**

This PD incorporates what I learned while taking The E in STEM: Meaningful Content for Engineering course in the Fall of 2019. I plan on integrating the use of an Engineering Notebook both in person and virtually while sharing my engineering notebook that I created in that course in which my students built a moon lander that could land successfully on the moon. This activity was taken from NASA's Jet Propulsion Lab and combined with the Design Squad which therefore incorporates a NASA element into the PD.

**Who is your proposed audience? Which teachers will you serve with your PD and activities?** My proposed audience is elementary teachers. These teachers are able to specialize in any area as I will be showing them how to incorporate engineering activities into their content.

**What grades, subjects, and how many students do they teach?** The teachers in attendance will be elementary teachers and may teach various subjects. I do not currently know the specific teachers attending so I am unsure about which subject they teach or how many students they have.

**What STEM concepts or learning goals will you and your materials address which can potentially replace other classroom activities? List NGSS and CCSS or your state standards.**

\*Will be able to identify the Engineering Design Process and its steps.

\*Will be able to navigate the NGSS and find the standards that compare with the PA Science Standards.

\*Will plan an engineering challenge that can be implemented into a unit that they plan on teaching this year.

**NGSS:**

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well

each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

**PA Core Standards:**

CC.1.5.K.A-CC.1.5.5.A Speaking and Listening: Engage effectively in a range of collaborative discussions on grade level topics and texts, building on others' ideas and expressing their own clearly.

\*The core standards will vary depending on what content area teachers are wanting to use for their design challenge plan.

**How long will the session be?** I am aiming at a 60 minute PD session with the understanding that it might run over depending on how in-depth of a discussion will occur and any lingering questions that attendees have.

**How will you recruit your audience?** I approached my administration about this PD session and they will be discussing it during their PLC meetings. They have to make this voluntary as our inservice schedule is already booked. My mother is also a STEM facilitator at one of the Intermediate Units in our state. One of her schools was going to visit my district in the spring so they are looking at attending to learn more about what I do with my STEM program.

**Where will you advertise your PD session?** I am advertising my PD through my district's Intermediate Unit (8) as well as my mother's Intermediate Unit (10). This will then go to all of the school districts throughout their IU.

**To demonstrate that teachers have learned something new, you will generate a pre- and post-survey. What, in general, will your pre-survey and post-survey ask?** I want my pre- and post- surveys to ask the same questions so I can see the growth from the beginning to the end of the session. These questions will ask for their confidence levels in understanding and implementing topics such as the NGSS standards, the Engineering Design Process, assessing a design challenge, etc..

**What outcomes or expectations do you hope to see for your educators?**

By the end of this PD session, I want the attendees to be able to navigate through the NGSS standards and apply them to other content areas. Attendees will leave with an Engineering Design challenge created and ready to implement in one of their learning units and aligned to the NGSS and PA standards while also creating an assessment piece.

**How will you follow up with the teachers in attendance?** I will send out an email (I will have provided my email at the end of the PD) thanking them for taking the time to join me for my PD session. I will also include the post-survey in my email and ask that they complete it within a timely manner. Lastly, I will make sure they know all of my contact information and social media and that I can be reached at any time for questions.

**What data collection methods (e.g. surveys, interviews) will you use to analyze the PD's success?** Since I will most likely be presenting this via Zoom, I plan on sending out a survey the day after the PD in order to gather data. A survey will not take up the precious time of the teachers but can still provide me with accurate information. I do not want to send it out the day of the session because I want to give it time to sink in but I do not want to wait either because the teachers will have plenty of other things to think about instead of the session the longer I wait.