

EYVAZ – PROJECT PROPOSAL PLAN

- **What is the title of your STEM professional development?**

What about the E for science/STEM teachers?

- **Why did you select the topic?**

I loved all of the courses I took with the Endeavor program, but the one course that seemed most applicable for when I first return to teaching was *The E in STEM* course. I already incorporate scientific inquiry into my science lessons, but I am still figuring out how I will better incorporate the engineering design process as well into my science classes. Since I am not currently teaching, I am not yet able to implement and observe the results of using the engineering design process in my science classes, but I feel convinced it will benefit my students. I am also currently completing a capstone project where the topic is combining scientific inquiry and engineering design in the STEM classroom, the end result being a curriculum unit put together by me that embeds both pedagogical techniques. All this being said, I chose this topic, because I want to share a bit of what I learned about engineering design with other teachers as well as hope that other teachers will share ideas they may have and/or formulate thanks to the PD. I think the engineering design process tool would be quite beneficial to share with fellow science teachers as we try to make our lessons more relevant and practical for our students.

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

The main asset/resource I plan to present and share during the PD is the *PBS Design Squad* (<https://pbskids.org/designsquad/parentseducators/index.html>) website that was explored during *The E in STEM* course. It has ready-made teacher guides and student activities that I feel fellow science teachers would greatly appreciate. During *The E in STEM* course, I used at least one of the activities to conduct an engineering design-based lesson (https://pbskids.org/designsquad/pdf/parentseducators/DS_NASA_08FeelHeat_LN_CS.pdf) with adult family members who live nearby acting as my students, and it was so easy to prep and follow...something teachers appreciate in the busy world of teaching. My PD would involve working on one or two (more likely just one) of the activities on the site as an example of utilizing the engineering design process in the science classroom. It would also probably be beneficial to consider presenting at least one of the videos on the website that show students working on an engineering design project.

- **Who is your proposed audience (minimum 12)? Which teachers will you serve with your PD and activities? What grades, subjects, and how many students do they teach?**

My proposed audience is middle school and/or high school science (e.g. chemistry, biology, physics, etc.) teachers, and at least 5 teachers would be preferred. If I am able to share my PD with former colleagues, the number of students per class could be anywhere from 1 to 20/25 students. Some of the schools in the school system where I previously worked are quite small with very small class sizes...especially at the middle school/high school level.

- **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.**

The focus will be the concept of engineering design, the *E* part of STEM. The learning goal is for the teachers to be more familiar with engineering design and to feel more confident to incorporate engineering design into their classrooms. This pedagogical concept can ideally help to replace traditional teaching methods used within the classroom (e.g. lectures).

Since I plan to address engineering design in general as well as with examples, I should make reference to the NGSS engineering design standards for the teachers:

- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.**
- HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.**
- HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.**
- HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.**

• How and where do you intend to carry out your PD? How long will the session be? When will it be held? Will teachers have access to computers?

I plan to carry out my PD by creating a series of videos that teachers can watch. I would send the videos via e-mail/Dropbox/etc to the teachers. In total, the series of videos will ideally add up to 1 hour, and the teachers watching my PD series will be able to watch them when it fits into their schedule. I could ask them to watch the videos by a certain date, but I do not want the teachers to feel pressure to accomplish all of them if they do not have the time to do so. The teachers watching these videos would need access to a computer for the sole purpose of watching the videos.

• What, in general, will your pre-survey and post-survey ask?

My pre-survey would ask questions to gauge the level of familiarity with the engineering design process, to find out if any of the teachers have used the engineering design process in their classrooms (if so, how?), and if the teachers have an interest in incorporating the engineering design process in their classrooms.

My post-survey would gauge how confident they feel in their understanding of the engineering design process, if they feel confident/how confident they feel in incorporating the engineering design process, and if they are interested in incorporating the engineering design process in their classrooms – thanks/no thanks to the PD.

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

I hope that the educators will feel confident/more confident in their understanding of the engineering design process as well as in beginning to incorporate the EDP in their classrooms. I also hope this PD would lead to more future discussions about incorporation of the engineering design process in our science classrooms.

• How will you follow up with the teachers in attendance?

I consider the post-survey as a follow up. Otherwise, I would say that FB group chats, e-mails, etc. are the means by which I can follow up with the teachers who attend my PD video series to see if the series was actually helpful for the teachers, to continue discussion about the engineering design process, and to find out if the teachers discovered useful EDP activities that could be shared with the group.

• What data collection methods (e.g. surveys, interviews) will you use to analyze the PD's success?

I plan to use a pre-survey and a post-survey via Google docs to analyze the PD's success. I have never actually used Google docs for this purpose, but I think (with a little bit of patience and help) I will be able to figure it out.