Using the Engineering Design Process with NASA Lessons

- What is the title of your STEM professional development?

    o Using the Engineering Design Process with NASA Lessons

- Why did you select the topic?

    o After completing the class, The E in STEM: Meaningful Content for Engineering last fall, I feel like I learned important information that I can share with the teachers in my building.

    o The teachers in my school are currently using a program called Mystery Science to meet our science standards. This is a great program, but it leaves little control/creativity in the hands of the teachers.

    o IF my school ever starts doing after school groups again, I could be providing some teachers with ideas as to what they can do next with their after-school group.

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

    o Through my introduction of the Engineering Design Process, I will touch on how the design process really should be able to go both directions. (Something I learned from Arnone in my first Endeavor class, Methods of Stem Education - Elementary.)

    o I will share a lesson that I used this year with my 2nd graders – this lesson did not come from the NASA website. It was something Professor Brown and Cassandra Armstrong shared with me.

    o The lessons I will share with the teachers attending my PD will come directly off of the NASA website.

    o I was also thinking about sharing some of the note taking strategies in the Literacy and Discourse Practices in STEM like using sketchnotes. I believe that this strategy would be extremely beneficial for the younger students Kinder, 1st, and possibly even 2nd grade.

- Who is your proposed audience?

    o Lower Elementary teachers – kindergarten, 1st, 2nd, and 3rd grades.

    o This PD will also be offered to the Specials teachers, but not mandatory.

- Which teachers will you serve with your PD and activities?

    o All general education teachers.

- What grades, subjects, and how many students do they teach?

  o 2 - Kindergarten Teachers – 38 students

  o 2 - 1st grade Teachers– 35 students

  o 3 - 2nd grade Teachers– 52 students

  o 3 - 3rd grade Teachers – 58 students

  o Virtual teachers: grades ranging from kindergarten all the way up to 6th grade – roughly 15 students

- What STEM concepts or learning goals will you and your materials address which can potentially replace other classroom activities?

  o **I'm not sure what learning goals I will be addressing – or how they could replace other classroom activities. Could you maybe help me with this area of my proposal?**

- **List NGSS and CCSS or your state standards.**

  o K-2 –

    ▪ K-2-ETS1-1. Ask questions, make observations, 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 its 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 perform.

  o 3rd –

    ▪ 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specific criteria 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.

- How long will the session be?

- o My current district has scheduled staff meetings twice a month. I will need to talk with my principal, but depending on the allotted time – anywhere between 1 - 3 hours.

- **How will you recruit your audience?**

  - o Our principal sends out an agenda regarding the staff meetings that she holds – I will ask her if I can write a little blurb that gets teachers excited about the PD that I am going to offer to the staff.

- **Where will you advertise your PD session?**

  - o Through the district email.

- **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?**

  - o What experience do you have with the engineering design process?

  - o How comfortable are you with using resources; other than Mystery Science, when it comes to teaching science/STEM?

  - o If you were provided with a resource where you could get lessons that were truly integrated, would you use this resource to pull lessons to use with your students?

  - o What subjects do you feel like are the most challenging to integrate?

    - Literacy
    - Science
    - Technology
    - Engineering
    - Math

  - o (I am open to including more questions, I just can't think of any more right now.)

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

  - o I am hoping that more teachers walk away with a confidence when it comes to integrating science/engineering with the other subject areas. Our school day has been trimmed down to the smallest amount of usable time and we don't have time for the normal fun stuff we use to do in our classrooms. If I can get the teachers to be willing to integrate more than one subject (even if that means moving away from the curriculum the district has provided us with) hopefully we can have a little more time for the fun lessons the students love that help students learn the targets/standards we are working on.

- **How will you follow up with the teachers in attendance?**

- o I will try to schedule a time with the different PLC's where I can go in and check on the teachers in the different grade levels.

- o If this option doesn't work, I can ask my principal if I can use another chunk of time during one of our staff meetings to check in with the teachers.

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

  - o Pre-session and post-session surveys

  - o Interviews with grade level teachers/Specials teachers (if I have specials teachers that attend)