

Belloli Leadership PD Proposal

Title of STEM Professional Development : Square Peg in a Round Hole - Making Engineering Fit in Your Class

Topic Selection Reasoning: In 2016, Indiana added engineering as a subset of the state science standards. In addition, Science and Engineering Process Standards (SEPS) was also added. Indiana did not adopt the Common Core or NGSS Standards, but instead created the Indiana Common Core Standards. Therefore, the state determined that teaching engineering was a need, but resources to do so were minimal. Now, curriculum is readily available, but i

In the summer of 2015 I attended the SLED Summer Institute hosted by Purdue University. SLED is an acronym that stands for Science Learning through Engineering Design. This really helped change my perspective on how to teach engineering, how to incorporate it and how important it is. I started enjoying teaching content more by being able to integrate engineering. At our building, these standards used to be covered in a related arts class called STEM. This class has now switched to specific PLTW curriculum. So, students are not getting the exposure to engineering that they previously had.

With the NASA Endeavor Courses, I have gotten more experience developing 5E STEM lessons. Teachers at my school are willing to incorporate engineering into their classrooms, but don't necessarily know the purpose behind it or how to create these types of lessons. I've found a tremendous difference in the level of engagement and learning that takes place when incorporating engineering and I want to share that.

NASA Assets/Endeavor Course Connection

- Endeavor Course- The E in STEM
- NASA Assets - [NASA/PBS Design Squad Workshop for Educators](#)

Proposed Audience

- > 5th - 8th Grade Science Teachers, inviting 24
 - 5th & 6th Grade teachers each have ~ 90 students
 - 7th & 8th Grade teachers each have ~ 150 students

STEM Concepts/Learning Goals

IN State Standards

SEPS.1 Posing questions (for science) and defining problems (for engineering)

SEPS.2 Developing and using models and tools

SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)

SEPS.7 Engaging in argument from evidence

SEPS.8 Obtaining, evaluating, and communicating information

6-8.E.1 Identify the criteria and constraints of a design to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.

6-8.E.3 Analyze data from investigations to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.

Session Setup

- **Location** - School Multi-purpose Room/Innovation Center
- **Length** - (1 hr) 3:45 - 4:45 pm
- **Proposed Date** - Wednesday October 9, 2019
- **Computer Access** - Teachers will bring school-issued devices

Pre-survey/Post-Survey Questions -> via Google Forms

- Have you ever taught Engineering to your students? *yes/no*
- How familiar with the Engineering Design Process are you? *1-4*
- How comfortable are you with incorporating engineering in your classroom? *1 - 4*
- What would prevent you from teaching engineering in your classroom?
- What do you want/need to be able to incorporate engineering into your curriculum?
- Have students ever designed or built a prototype in your class? *yes/no*

Outcomes/Expectations

Essential Question: How can I best integrate engineering into my classroom?

- Explain the engineering design process to students
- Identify what generally occurs at each step/phase
- Evaluate engineering design lessons and modify as needed
- Develop a design brief for an engineering design lesson that incorporates science or social studies content

Follow up

- Feedback based on digital interview
- Offer to co-teach
- Potential Part 2 of PD, if interest

Analysis of PD's Success

- Comparison of pre-PD to post-PD survey
- Digital Interview - will send teachers questions that they can write, type or record a response (Flipgrid or GoSynth)