

Identifying authentic STEM lessons

A PD Proposal

by Lynette Sigh

I am the Kindergarten teacher in a Pre-K-12 School that is working toward becoming a model STEM School. We have an outdoor garden. We have a STEM Lab. Our High school has a STEM certification program (<https://www.spencervilleacademy.org/stem-expo>). We host for the community a STEM Expo. This year, STEM teachers in Elementary and High School were hired.

Our school's goal is to emphasize the "E" in STEM. An approach in which students become engaged in their learning and think through real world experiences.

The problem is none of our teachers are STEM certified. Many teachers are familiar with the Scientific Method, but not the Engineering Design Process; therefore, many teachers see Science as an isolated subject. Teachers are also creating lessons which lack the Engineering mindset and application. If the Engineering component is to be front and center, teachers need to be familiar with the engineering design process. My PD will answer the questions: What are the key components that make up an Engineering Design process? How does the Engineering process differ from the scientific method? How to identify Authentic STEM design lessons?

There will be two separate PDs presented to 19 teachers, who teach over 400 students. There will be an elementary and High School PD. On September 24th the first hour long PD will be presented to our STEM Team. The team includes one elementary and one High School STEM leader, and several high teachers (Math, Technology, Art, Science). I am working closely

with the High School STEM leader to provide information and design challenges that are relevant to the needs of the team.

Both PD will follow the same format. The pre and post survey will provide baseline data; such as, knowledge of key components of a STEM lesson, knowledge of steps in the engineering design process, and as well as teachers' desires and needs. The hour PD will be presented in the School's STEM Lab using the Smart board and hands-on supplies in the lab. Outside computers are not necessary.

The PDs will begin with a Power Point referencing the following: NGSS Engineering standards, components of the Engineering process, Scientific method and NASA resources (NASA grade level links to engineering lessons, and quotes from Researcher News NASA). The emphasis of the powerpoint will be on recognizing authentic STEM design lessons. A powerpoint video slide will show my students, kindergarteners, describing our current Engineering project. The STEM team will describe key components that make the kindergarten lesson an authentic STEM design lesson. We will play a quick game in which teachers will identify authentic STEM design lessons. The last 20 minutes teachers will participate in an engineering design challenge using supplies in the STEM Lab.

The follow up will look different for each PD. The follow up for the STEM Team will be an interview with the High School teacher to determine if there has been an improvement in STEM lesson contents. For the Elementary teachers, I will work closely with the Pre-K and 2nd grade teachers to create standard based engineering lessons which we will showcase to the other classes and the community.

Links to some references:

Endeavor:

Reference the design process and Appendix B: (<https://www.dropbox.com/s/s3kd4hz5r75k712/L.%20Sigh%20%28Design%20Notebook%29.pdf?dl=0>)

NASA Reference Scientific Method and Design Process https://www.nasa.gov/centers/langley/news/researchernews/rn_PTSl andNIA.html

Comparative Analysis of Design models: <https://www.dropbox.com/s/fdu066a74wpotjh/L%20Sigh%20Comparative%20Analysis%20%28Pre-k%20-%202%29.pdf?dl=0>

Reference this article for interdisciplinary emphasis: <https://www.dropbox.com/s/w3jc7c4zc157a5m/LiaoArticle%20%282%29.pdf?dl=0>

NASA reference:

https://www.nasa.gov/centers/langley/news/researchernews/rn_PTSl andNIA.html