

## Lisa Holt-Taylor PD Proposal

### Title: STEM, Robotics and Maker Spaces. How Does It All Fit Together

- Why did you select the topic?

This topic was selected for a couple of reasons; 1. Although STEM has been around for a few years, there is a lack of PD within our building with regard to its meaning. 2. There seems to be some confusion between what is meant by inquiry, engineering, versus tinkering. 3. There are some new initiatives being rolled out including robotics, coding and Maker Spaces (basically incorporates building models and very simple coding).

On January 29, I rolled out our first afterschool Lego WeDo2 Club. This is the first robotics club for our school. Part of my intention is to share some background knowledge and some depth of the activities offered in the Lego program.

- How does your PD integrate NASA assets and/or content from the Endeavor courses? This professional development incorporates some course work from each of the NASA courses that I have taken up to this point: Methods in STEM, The E in STEM, and the Robotics and Coding courses.

I will include some resources via a webpage from the NASA site giving hands on activities to reinforce and extend content for K-6 teachers as well as add some Maker Space links.

#### STEM topics covered include

- I. What is STEM?
- II. What is inquiry? What is engineering? What is tinkering? How are they different? What does an inquiry look like compared to an engineering project? What is the Engineering Design Process?
- III. Look at WeDo 2 connections with science inquiry and engineering while incorporating building and coding.

- IV. Tie into the Maker Space activities and how these will assist students in building and coding.
- V. Share my experiences of implementing the Hand Bee Pollinator Unit with that of the Balloon cars. The bee unit had content knowledge and lots of vocabulary works versus the balloon cars, the concepts were taught as we completed the activity. Looking at student performance I found that students performed better on the bee unit where students were taught the concepts prior to making the hand bee pollinators.
- VI. Give some additional resource ideas to investigate for classroom engineering and Maker Space activities.

#### Activity Time Line:

1. Pre Survey-Give this survey prior to meeting to help guide the PD areas.
2. Google Slides presenting the terms STEM, Inquiry, Engineering, and Tinkering.
3. Look at Lego WeDo 2 Software and then complete WeDo 2 Speed Activity.
4. Discussion on "How does the Maker Space fit in?"
5. Share resources from webpage [holttaylorengineering.weebly.com](http://holttaylorengineering.weebly.com)
6. Post Survey will be given

This professional development is expected to be 90 minutes in duration during our staff in-service day on Feb. 15, 2019.

#### Who is your proposed audience?

- My proposed audience will be approximately 12-15 teachers in grades K-6 teachers from my Elementary building. Grades K-2 teachers are self contained classrooms, whereas in Grades 3-6, the teachers are content area specific. Our building currently serves about 540 students. This is a public school.
- 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.

Ohio Model Curriculum Revision includes the following:

- TECHNOLOGICAL AND ENGINEERING DESIGN
  - o Identify problems and potential technological/engineering solutions
  - o Understand the design process, role of troubleshooting
  
  - o Understand goals of physical, informational and bio-related technologies
  - o Recognize role of design and testing in the design process
  - o Understand how physical technologies impact humans
  - o Apply research, innovation and invention to problem solving

- **How and where do you intend to carry out your PD?**

On Feb. 15, we have a scheduled PD in service to be held at our school and will last about 90 min. Teachers will have access to computers and the WEDO 2 software and kits during the in service.

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

1. My pre (<https://goo.gl/forms/HI5eaQPtjNcakBj73>) and post survey (<https://goo.gl/forms/NfHj9zDvfCSkjlCq1>) will be administered at the beginning and end of the professional development.
- Assess teacher knowledge on STEM, inquiry, engineering, and tinkering.
- Attitudes of teachers toward teaching science inquiry and engineering.
- Assess teacher knowledge about the WeDo 2 program and its connection with science and engineering.
- Assess attitudes on new initiatives including WEDO2 and Maker Space

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

Some outcomes I would like to see would include:

1. Increase knowledge in STEM, and to identify the difference between science inquiry, engineering design process, and tinkering.
2. Increase interest in LEGO WEDO 2 Club and recommending students into participating.

3. Interest in activities in incorporating hands on activities especially in NASA resources and Maker Station links.

- **How will you follow up with the teachers in attendance?** I will administer a post survey and will check in with teachers who seem to be open to trying some of the NASA and Picture Perfect engineering projects. As I find resources ideas for the classroom and our school Maker Space, I will continue to post activities through a website [holttaylorengineering.weebly.com](http://holttaylorengineering.weebly.com). A couple people on the technology committee will be attending the professional development that are responsible for helping to develop our Maker Space.

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

There will be a pre and post survey and I will ask for feedback on the objectives posted above. Follow up with members of the technology committee to see if further Maker Space links are needed. Check in with the teachers to see if they are using the website and needs for any additional engineering activities.