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SCED 545 STEM Leadership Seminar
STEM PD Proposal
9/17/18

What is the title of your STEM professional development?

STEM Instruction and Assessment: Engineering Design in the K-5 classroom

Why did you select the topic?

I chose this topic for several reasons. The first is that I love teaching the engineering design process! I think there is a great opportunity in my district to apply what I have learned about STEM education, and thought I would start with engineering design. There is a need, especially at the K-5 elementary level, for integrated STEM instruction and the lessons I have selected are aligned to the grade level performance indicators. There is also a need for PD around science (and STEM) assessment practices, so I will be incorporating that into the session.

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

During my PD session I will “teach” one lessons from NASA’s JPL activities, and teachers will have some work time for guided exploration of the resource to implement in their own classroom. I will also share with teachers the NASA BEST activity guides among other resources.

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 audience is open to the K-5 teachers at Cushing, Thomaston Grammar School, South School and Ash Point school. These teachers teach all core subjects in their classrooms, so there are natural opportunities for integrated STEM lessons. Interested teachers will sign up for the session, which is voluntary. The inclusion of how to assess the NGSS standards as articulated in the RSU 13 performance indicators in STEM lessons will be enticing.

The session I have planned has a maximum of 15 teachers, and each teacher has between 13-20 students. It is capped at 15 for this session because I was lucky enough to secure access to work beyond contract funds through the curriculum director to fund

the project for 15 teachers for two hours. Extending it beyond the required hour means I can include the conversation around STEM assessment and also provide a structured “work session” for teachers. That way they can begin planning the implementation of their STEM engineering design lesson so they leave with something ready to implement.

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.

PD Lesson: Using Engineering Design: “The E in STEM”

- What is engineering design [video](#).
- Discussion of engineering design process, how it links to NGSS and CCSS standards.

The [lesson](#) I will teach to introduce using engineering design in the classroom is Parachute Design from JPL and it is aligned to:

Parachute Design

NGSS	CCSS-Math	RSU 13 Performance Indicator
<ul style="list-style-type: none"> ● K-2-ETS1-3 ● 2-PS1-2 	<ul style="list-style-type: none"> ● 2.G.A.1 ● 1.G.A.2 ● K.G.A.1 ● K.G.B.4 ● K.G.B.5 ● K.MD.A.1 ● K.MD.A.2 ● 1.MD.A.2 ● 1.MD.C ● 1.MD.C.4 ● 2.MD.A.1 ● 2.MD.A.4 ● 2.MD.D.10 ● 2.MD.D.9 	<p>* I can gather and analyze data to determine which materials have properties that are best suited for an intended purpose.* (2.PS1.2, K-2.ETS)</p>

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?

The PD will be held at the RSU 13 central office in Rockland on 10/9 at 3:15pm. It will

be two hours. Teachers will have access to their school issued iPad pros and Macbooks and a strong wifi network.

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

Pre-survey

Understanding/comfort level working with NGSS, engineering design

Understanding of rubrics and assessment regarding STEM and NGSS

Post-survey

Did PD increase understanding/comfort level working with NGSS, engineering design

Did PD increase understanding of rubrics and assessment regarding STEM and NGSS

Will they plan to integrate what they learned in their own classroom

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

- Integration of engineering design in classroom instruction
- Identifying myself as a resource for STEM education.
- Identify ways to assess NGSS in STEM activities in the classroom

How will you follow up with the teachers in attendance?

I will follow up with teachers electronically (I am in a different building).

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

I will use google forms to collect data. Once at the end of the PD session as an "exit ticket" and then a follow up survey after they have had a chance to implement and/or further reflect on the impact of the PD.

RSU 13 Performance Indicators with Engineering alignments (these will be used for teachers during the guided work session towards the end of the PD)

* I can use tools and materials to design and build a device that uses light or sound to communicate over a distance.* (1.PS4.4, K-2. ETS)

* I can design a solution to a human problem by applying what I learned about how plants and/or animals use their external parts to help them.* (1.LS1.1, K-2.ETS)

* I can develop a model that mimics how an animal disperses seeds or pollinates plants.* (2.LS2.2, K-2.ETS)

* I can compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* (2.ESS2.1, K-2, ETS)

* I can evaluate design solutions that reduce the impacts of a weather-related hazard.* (3.ESS3.1, 3-5.ETS)

* I can evaluate solutions to problems caused by environmental changes to show how populations of plants and animals can or cannot adapt.* (3.LS4.4, 3-5.ETS)

I can evaluate design solutions that reduce the impacts of a weather-related hazard. (3.ESS3.1, 3-5.ETS)

* I can ask questions, gather information, and develop a design to use electric and/or magnetic forces.*
(3.PS2.3, 3.PS2.4, 3-5.ETS)

* I can design, test, and refine a device that converts energy from one form to another. (4.PS3.4, 3-5.ETS)

* I can generate and compare different kinds of patterns to transfer information.* (4.PS4.3, 3-5.ETS)

* I can generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* (4.ESS3.2, 3-5.ETS)

* I can find and use information about how communities protect the Earth's resources and environments.*
(5.ESS3.1, 3-5.ETS.1-2)

* I can conduct an experiment to determine whether the mixing of two or more substances results in a new one.* (5.PS1.4, 3-5.ETS.1-3)