Leadership Proposal

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Endeavor STEM Teaching Certificate Project

STEM Leadership Seminar SCED 545

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This profession development will focus on a specific resource that will support teachers in providing STEM instruction to students that encompass the three dimensions of the Next Generation Science Standards (NGSS), which are the Disciplinary Core Ideas, Science and Engineering Practices, and Cross-Cutting Concepts. The resource that will highlight this is NASA Jet Propulsion Laboratory (JPL) website. This website provides a wealth of information for teachers on a variety of topics. The PD will first introduce teachers to what the JPL is with a short tour of the website and then will focus on using the education resources provided by the JPL. During the introduction, the NGSS standards as well as the three dimensions of the standards and how they work together will be discussed. Teachers will then engage in a deep dive into one of the lessons to see how to navigate the website and use resources on NASA's website to support the lessons.

It can be difficult to find STEM lessons that embody the three dimensions of the NGSS while also integrating real time science and data gathered by NASA. The JPL also provides videos explaining how NASA scientist collect their data and "do science." The team at the JPL have created lessons for K-12 that are quick and easy to implement. They are a great springboard for creating their own lessons that incorporate the three dimensions of the NGSS.

The proposed audience for this professional development are the K-8 teachers in STEM school. As the K-2 science and engineering specialist it would be beneficial to have the k-2 teachers to join to facilitate future collaboration and encourage them to not shy away from integrating STEM into their own classrooms in some capacity.

The active learning portion of the PD will focus on the lesson *The Types of Clouds and What They Mean* found in Engineering in the Classroom portion of the JPL website. This lesson

incorporates several standards in science, math, and language arts. These standards are listed below.

- **(DCI) ESS3.B**: Natural Hazards Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.
- **(CCC) Cause and Effect:** Events have causes that generate observable patterns.
- **(DCI) ESS2.D**: Weather and Climate: Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.
- **(CCC) Patterns**: Patterns in the natural world can be observed, used to describe
- **(SEP) Asking Questions and Defining Problems**: Ask questions based on observations to find more information about the designed world.
- **(SEP) Obtaining, Evaluating, and Communicating Information**: Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.
- **CCSS.MATH.CONTENT.K.MD.B.3** Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.1
- **CCSS.MATH.CONTENT.1.MD.C.4** Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
- **CCSS.ELA-LITERACY.RI.K.1**: With prompting and support, ask and answer questions about key details in a text.

- **CCSS.ELA-LITERACY.RI.K.2** With prompting and support, identify the main topic and retell key details of a text.

This PD will take approximately one hour. A presurvey and postsurvey will be used to gauge teachers' attitudes towards teaching STEM lessons prior to the PD, there confidence in managing materials and technology in the classroom, their prior experience with using NASA resources, and the likelihood they will use the resource in their classroom/curriculum.

Possible survey questions:

-Can you think about a time in one of your current units that you can see yourself replacing something that you already doing for a resource you learned about in the PD?

- How confident do you feel teaching a STEM based activity in your classroom?

- How often have you used either NASA's website or similar (USGS, NOAA) to integrate real world problems or data into your classroom?

- What is your comfort level navigating the NASA Jet Propulsion Lab website?

The expectation is that teachers in other content areas will begin to incorporate STEM into their classrooms and provide their students a more integrated approach to the different disciplines. Follow up interviews will be conducted with those that participated toward the end of the year to give them ample time to incorporate one of the lessons. Classroom observations during a lesson from the JPL would provide feedback on how confident the teachers are in implementing these lessons. Assisting teachers in the classroom during one of the lessons could also be beneficial as a way to extend the PD and provide support beyond the hour spent during the session.

Resources

https://www.nextgenscience.org/sites/default/files/NGSSScreeningTool-2.pdf

https://www.jpl.nasa.gov/edu/

https://www.jpl.nasa.gov/edu/teach/activity/the-sky-and-dichotomous-key/