

1. Mini Professional Development Project Title

The title of my mini professional development presentation is “Understanding the Relationship between the Seasons and the Sun.”

2. Why did I select this topic?

I selected this topic because when teaching Earth Science, an essential component is that students understand how the apparent path of the sun changes on a yearly basis, what impacts we see on Earth because of the changing position of the sun striking the surface, and how studying the sun in the past has influenced people, cultures, and entire civilizations. The NASA lesson asset that I selected to help teach this concept was chosen because it highlights the connections between math and science and the cross-curricular content that students learn in both courses to help build their STEM foundation. Generating lessons that have students make these connections across disciplines is an important step to making students STEM literate and was also a main focus for us to incorporate into our teaching practices that I learned in my methods of STEM education class. By using this lesson that incorporates both math and science to explain the positions of the sun and celestial observations, I am going to show my students how math and science are connected together to understand such basic principles like observations of the sun on a yearly path. Another reason why I selected this NASA asset is because it will be an essential component of the Explore phase of the 5E lesson plan model which was something I also learned in my methods of STEM education course and have started implementing into my classroom teaching practices. The 5E lesson plan model helps students build the connections and interact hands on with phenomena to help them explain the natural world around them. This NASA asset has students explore angles and angular relationships to help generate connections between celestial observations, the apparent path of the sun, and what we see on earth because of these apparent celestial changes. Another reason why I selected this topic because I think it will be useful and applicable for teachers who teach Physics and physical science because they also make connections between math and science, and this NASA asset and lesson plan helps engage students in exploring that relationship while also learning about an interesting topic that ancient astronomers and mathematicians were studying hundreds of years ago. Additionally, connections could be made to social studies content areas when students are learning about ancient civilizations and how they survived, thrived, and prospered utilizing these celestial observations.

3. Who will be involved?

- a. Who is your proposed audience? This is targeted for middle and high school science, technology, and engineering teachers as well as some math teachers

- b. Which teachers will you serve with your PD and activities? Members of the rye high school and middle school science department. There are 24 teachers in the department who will be invited to attend the PD.
 - c. What grades, subjects, and how many students do they teach? The department teaches 6-12th grade science, non-regents, regents and honors level living environment, chemistry, physics, forensic science, a variety of AP courses, as well as robotics, engineering, and PLTW engineering and design courses.
4. What “general” science or mathematics concepts or learning goals will you and your materials address which can potentially replace other classroom activities?

When I am giving the mini professional development I plan to take some time explaining the NASA asset, its connections to the Earth Science curriculum, as well as prior knowledge and content in mathematics the students will need to be successful. For younger grade levels/different mathematical ability levels I will also explain some modifications that can be done to adapt the lesson for the various types of learners in the classroom. Next I will explain the importance of helping students build STEM connections across different content areas and that it is an important role of the teacher to help facilitate students in making these connections. I will share some resources from my methods of STEM education class to show teachers how to make these connections and the benefits of making them to enhance student learning. In addition I will explain the 5E lesson plan model and how it should be incorporated to allow students the opportunity to explore phenomena and make their own connections to their learning and the content. I will share examples of 5E lesson plans I have made and work through the process of how 5E style lessons lead to enhanced student engagement as well as increased student participation, focus, and learning. The methods of STEM education class provided me with great examples and resources for how to generate engaging lessons that would better my teaching practices and I am going to share that with my colleagues as well. Lastly, I will share the NASA website and other NASA assets that are related to Earth Science and provide those resources to my colleagues as well.

5. Running the PD
- a. How and where do you intend to carry out your PD? This PD will be held at Rye High school in my classroom after school the first week in March. There are no meetings scheduled for that week so the department will be available to attend the PD session
 - b. How long will the session be? The session will be a total of 45 minutes to 1 hour. I will present my PD for 30-40 minutes and then we will have a brainstorming session about how we believe the NASA asset I selected

and presented on could be utilized in their classroom teaching practices or modifications that would need to be made for younger/older grade levels.

- c. When will it be held? The first week of March, I am still finalizing the exact date.
 - d. Will teachers have access to computers? Yes, I will sign out the laptop cart so that teachers can access the internet, the exact resource, as well as any other NASA resource throughout the PD session.
6. What outcomes or expectations do you hope to see for your educators?

At the end of this PD session I hope that the faculty in attendance understand a variety of things that I have learned throughout my time in the endeavor program including: the incorporation of NASA resources into my teaching practices, using the 5E model and 3D learning to engage students in learning and participating in their science educations, and collaborating with each other to benefit the learning needs of the students within our classrooms. I also hope that the educators see how the NASA resource can be modified to fit into their learning and how the implementation of outside resources and technology can be beneficial and engaging for students who may have science aversions. Since there will be time at the end of the session, I hope that the educators will also have time to find their own NASA resource that they can either use to incorporate into their classroom learning or replace it with an activity they already do to enhance student learning and engagement.

7. How will you follow up with the teachers in attendance?

I will send out a very short google form survey one week after the session to follow up with the PD as well as ask if they need help finding/incorporating/modifying the resources or activities to fit into their classroom learning. I am hoping to gather evidence of how beneficial the PD was so that I can share it with others outside of my school community maybe over the summer with feedback from my colleagues.