

Clare Gilroy
STEM Practicum PD Proposal

1. What is the title of your mini STEM professional development?

Making Respiration Relevant!

2. Why did you select the topic?

My school district is currently in the process of re-evaluating our curriculum to better increase student engagement and relevance. While this is district wide, it comes at a great time for science educators as we move to NGSS. This year, I have been trying to get a head start and implement more NGSS phenomenon throughout my lessons, as well as include more of an emphasis on real-world relevance of our content. While I know not all my students will become scientists, I want to build their scientific literacy, and understand the reason why our biology content is significant in the real world. According to Prather (2009) in “Teaching and learning astronomy in the 21st century” (a reading from my Chemistry in the STEM Classroom course), “only about 25% of the country’s adults were scientifically literate”. In an effort to address this issue, I am trying to better engage my students by making my content relevant to their daily lives. Additionally, after my Methods in STEM Education course this summer, I have been trying to incorporate more math in my lessons to better meet the “M” in STEM. This activity from NASA addresses both graph analysis and real-world application of respiration in a space station.

3. Who is your proposed audience? Which teachers will you serve with your PD and activities? What grades, subjects, and how many students do they teach?

I will be presenting at a monthly department meeting to about 20 middle and high school science teachers. The grades range 6-12, with levels ranging from co-taught to AP level. The subjects all range from Earth Science, Biology, Chemistry, and Physics since it will be the entire science department. High school teachers have about 80 students a day, whereas middle school teachers have about 120, due to the double periods at the high school levels. Some of our teachers are certified to teach more than just one science, while others teach various electives like Engineering and Science Research.

4. What “general” science or mathematics concepts or learning goals will you and your materials address which can potentially replace other classroom activities?

My goal is to show teachers that there is real data that can support the content we are already teaching. Rather than just have students regurgitate surface level facts about respiration, I want them to apply their knowledge and understanding to real-world scenarios. This makes science fun, exciting, and full of phenomenon. This could replace other classroom activities such as notes or cookie cutter labs, which don’t even truly fit the definition of a lab. In my own classroom, I would use this activity as an “Elaborate” phase from the 5E cycle that I learned about in my Methods of STEM class, since it would allow students to apply their understanding to a novel situation. In this activity, teachers can give students a chance to digest the data. Then, they can also allow students time to collaborate and hypothesize with their peers. Besides teaching students about respiration, this process allows them to build 21st century skills such as communicating ideas and working with others. Even if teachers don’t use this respiration data

(most likely for other biology or chemistry teachers, for partial pressure or other relevant content areas), they will hopefully be inspired to implement authentic, relevant data into their lessons.

5. 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?

My session will be about 20-30 minutes long in my science department chair's classroom. The session will be part of our monthly department meeting, which occur for one hour after school. During these meetings, we go through updates from the district for the first half. The second half of our meeting have revolved around curriculum review. My presentation will serve as an example of how I've revamped my curriculum for the new standards and the expectations of our district. This year, teachers have all been taking an opportunity to share some updates in an effort to both inspire and educate our colleagues, so this PD fits right in with my department's mission. Our district provides each teacher with their own Chromebook, which we bring to monthly department meetings, therefore teachers will have access to technology. The meetings take place on the last Monday of the month, therefore this PD will take place Monday February 24th.

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

The NASA asset I am using is "Respiration In Space Flight" (source: https://www.nasa.gov/audience/foreducators/mathandscience/controlcenter/Prob_Respiration_detail.html). This resource utilizes a real-world scenario of respiration in the International Space Station Construction. Besides showing teachers how to implement real-world data into their lessons, I also want to show teachers how many different ways they can utilize the data as a platform for instruction. For instance, besides discussing the equation of respiration and anaerobic/aerobic respiration using this resource, I could also lead students into a discussion about the effects of respiration on the body. I am hoping that after this session, other teachers implement more real-world data and scenarios into their lessons. While I know many teachers already include interesting connections, my goal is for teachers to understand the value of students working with the data themselves and having that "aha!" moment—not us as educators giving them the answer before they learn the content. This is reflective of a Paul Anderson Professional Development I attended about "keeping the wonder in science".

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

After the presentation, I am going to send out a Google Form to my colleagues to obtain concrete feedback. Typically, after presenting our curriculum review, we ask informal questions, verbally give feedback, or suggestions of other resources. I am planning on building in the last few minutes of the presentation for the attendees to complete the Google Form, as though it is an exit ticket. However, if there are a plethora of questions at the end of the session, my colleagues can complete the form at their leisure. I will also have teachers share out if they have any data sources they find useful so we can create a master list of platforms for teachers to utilize. I will share the collaborative list with my department as a follow up.