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Proposal

1) What is the title of your STEM Professional Development?

Putting the 5E Lesson to Work!

2) Why did you select the topic?

One of the units we teach in social studies in third grade is connected to the science curriculum. Science is considered a special at my school, so my team does not teach science. However, when we study landforms as part of the social studies curriculum, this unit connects to what the students are learning in their science unit. Many of my colleagues on my team have never heard of the 5E lesson plan. I would love to share this lesson plan with them and show them how they can include a 5E lesson in our landform unit that includes real data from live volcanos. This will help bring the material to life for the students and make it more meaningful.

3) Who is your proposed audience?

I work on a team of six teachers. We meet on Wednesdays and Fridays. I am currently the team leader and have asked my team if they are interested in learning about the 5E model and how it can be applied to our landform unit. We each teach classes ranging from 20-24 students, which would allow for an additional 100 students to learn from the 5E model.

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

This 5E lesson allows students to have a concrete experience with the landform of volcanoes.

Tactile access to information allows students to freely manipulate concrete materials and allows for more experiential learning. Historically, my students are drawn to the lessons on volcanoes, but we do not spend a lot of time digging deep into this area. Using the Next Generation Science Standards, I wanted to extend this unit to include more lessons that had students analyze the placement of volcanoes, and their impact on world communities and the environment. I felt this would further enrich our

current social studies unit as well as further integrate and reinforce the material that students are studying in science class.

This lesson integrates science standards and technology into social studies standards, further enriching students geographical reasoning and analyzing skills. One of the core ideas for the third grade standards of Weather and Climate is “ESS3.B: Natural Hazards. A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1).” By first being able to understand how volcanoes are created, students are able to explore how humans have been affected by volcanoes. This lesson directly supports this core idea as well as the cross-cutting concepts connected to this standard. Students will observe the cause-and-effect relationship between plate tectonics and volcanoes, integrating the social impacts that volcanoes have on human communities as well as reinforcing science concepts.

This lesson also supports the cross-cutting concept that science affects our everyday lives and is a human endeavor with a goal to learn as much as possible about volcano activity, in order to help predict future eruptions and hopefully save future lives. This lesson also supports many of the science practices. Students will be evaluating and communicating information obtained from their new knowledge based on their analysis of the data. This lesson also hits upon many mathematical practices including using appropriate tools strategically, as well as reinforcing specific skill developments such as constructing viable arguments and critiquing the reasoning of others.

This 5E model addresses the following standards:

Standard: New York State K-12 Social Studies Standards
Third Grade Geographic Reasoning

- Ask geographic questions about where places are located and why they are located there, using location terms and geographic representations, such as maps, photographs, satellite images, and models. Describe where places are in relation to each other and describe connections between places.

- Describe how human activities affect the environment of a world community; describe how the environment of a specific world community affects the human activities in that community

Next Generation Science Standards:
ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) *(Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)*

4-ESS2.B.1

- The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. See More 4-ESS2.B.1 Resources

Science and Engineering Practices

Analyzing and Interpreting Data

- Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
  - Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Obtaining, Evaluating, and Communicating Information

- Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.
  - Obtain and combine information from books and other reliable media to explain phenomena.

Crosscutting Concepts:

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1)

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life.

Mathematical Practices

- CCSS.MATH.PRACTICE.MP4 Model with mathematics.
- CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.
- CCSS.MATH.PRACTICE.MP6 Attend to precision.

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?

We meet as a team every Friday morning from 7:45-8:25. I plan to go over the 5E method with my team during this time. After our team meeting any of my 5 colleagues who are interested in learning more would be able to come observe this model in action in my classroom. We will use another planning block to reflect on the lesson and how it may have enriched our unit, as well as to further enhance our teaching through the use of this model.

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

I hope that they are as excited as I am to have more hands-on learning within this unit. I also hope to see a stronger correlation between lessons in our classrooms and lessons in the science classrooms. In addition, I hope that participants are informed on further resources and reference materials, such as the NASA website, in order to enhance and support curriculum in other areas.

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

Since we meet every Friday, I will schedule a time to reflect on this lesson. If I can be provided coverage, I will also offer to come co-teach the lesson with my colleagues for support.