

STEM Professional Development Proposal

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SCED 545: STEM Leadership Seminar

Endeavor STEM /Adams State University

Spring 2021

Title: How to incorporate NASA resources to create interdisciplinary connections.

Date: March 16 at noon. All 6th-8th grade math teachers and the assistant principal are automatically required to attend math PLC every 2 weeks, so I don't need to promote my PD.

Duration: 1 hour.

Proposed audience: 6 math teachers and 1 assistant principal.

Reasoning: In my online school, we don't have a STEM program and it doesn't have great interdisciplinary connections as each course stands by itself. Incorporating NASA resources will help create interdisciplinary connections between math and other subjects.

Integration of NASA assets and content from Endeavor Courses.

How to read and understand NGSS standards: <https://www.nextgenscience.org/>

NASA eClips 5E plan: <https://nasaclips.arc.nasa.gov/teachertoolbox/the5e>

Math resources at Space Math at NASA: <https://spacemath.gsfc.nasa.gov/>

NASA eClips real world math videos for 6th -8th grade levels:
<https://nasaclips.arc.nasa.gov/video/realworld/real-world-icesat-2-and-earths-cryosphere>

A couple examples of 5E lesson plans that I've developed through Endeavor courses that will use these NASA resources:

NASA images of Jakobshavn glacier retreat: <https://svs.gsfc.nasa.gov/3395>

NASA climate kid website: <https://climatekids.nasa.gov/how-to-help/>

NASA Ozone Watch site to analyze ozone hole data to learn about the ozone depletion in Antarctica:

https://ozonewatch.gsfc.nasa.gov/facts/hole_SH.html

https://ozonewatch.gsfc.nasa.gov/monthly/S_H.html

https://ozonewatch.gsfc.nasa.gov/meteorology/figures/ozone/to3area_0907-1013_toms+omi+omps.txt

Social Studies connection using Google Earth: <https://www.google.com/earth/>

NASA media studio about snowflakes and teachers can creativity by adding visual arts integration by having the students create paper snowflakes: <https://svs.gsfc.nasa.gov/12507>

Learning Outcomes: Teachers will learn about 5E plan and how to incorporate NASA resources to create interdisciplinary connections between math and science. Teachers also will learn that they can incorporate ELA by having the students read both nonfiction and real-life reading about NASA missions and studies. Teachers will learn how to add social studies connections by having the students use Google Earth to explore specific geographical locations

related to the lesson plans such as the Jakobshavn glacier, Antarctica, etc. Teachers will learn how to add creativity by having the students create their own unique paper snowflakes while they're learning geometry.

NGSS standards: Students who demonstrate understanding can:

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century (MS-ESS3-5).

Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity (MS-ESS2-4).

7th Grade Math CC Standards: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations (CCCS:7. SP.4).

Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. (CCSS: 7.G.A.2).

7th Grade ELA CC Standard: Engage in a wide range of nonfiction and real-life reading experiences to solve problems, judge the quality of ideas, or complete daily tasks.

Social Studies CC Standard: Use maps and geographic tools to find patterns in human systems and/or physical features.

7th Grade Visual Arts National Standard: Develop criteria to guide making a work of art or design to meet an identified goal (VA: Cr1.2.7a).

Pre-survey questions using Google Forms:

On a scale of 0 to 5 (lowest to highest), please rate your knowledge about these topics:

- 1) Your knowledge about STEM or STEAM Education.
- 2) Your knowledge about NGSS and 5E plan.
- 3) Your knowledge about using NASA data to create interdisciplinary connections.

Post-survey questions using Google Forms:

- 1-3) Same questions as listed in pre-survey.
- 4) Please list at least one takeaway from this PD.
- 5) Is there one thing that you want to try right away? If yes, which one?
- 6) What suggestions or feedback do you have for me?

Follow up questions using Google Forms in May to give teachers ample time to explore all the resources and implement in the classroom after the PD.

Were you able to implement at least one of the NASA resources in your classroom after the PD?

If yes, what did you implement? Did you notice a difference in student engagement or learning outcome?

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