

What is the title of your mini STEM professional development?

Integrating Art into STEM Polymer Recycling Module

Why did you select the topic? I took the NASA course [The Arts in STEM: Advancing Meaningful Integration](#) in the Summer of 2019 and realize that art can really enhance STEM and the learning process. I also did some STEM modules for a summer camp at our work and realized that I was incorporating some creativity and “art” into the modules without me realizing it. I want to share with others what I did to officially incorporate it into the STEM module.

How does your PD integrate NASA assets and/or content from the Endeavor courses?

I plan to introduce the attendees to the NASA resources available to aid in developing lesson plans and/or to generate ideas for incorporating activities into their existing demonstrations/lesson plans. I also am using last semester’s class work as mentioned above for the STEM PD, so this is total integration and utilization of what I have learned. I am transferring my knowledge from the NASA classes to our workforce in the Army.

Here is some resources that I have utilized for my modules:

<https://sealevel.jpl.nasa.gov/files/archive/activities/ts3hiac1.pdf>

https://www.teachengineering.org/lessons/view/csu_polymer_lesson01

https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/WLMR_Guide.html

Who is your proposed audience (minimum 12)? Which teachers will you serve with your PD and activities? What grades, subjects, and how many students do they teach?

I am not a classroom teacher, but a plastic engineer working for the Army. I have opportunities to lead STEM modules. This summer I had the opportunity to lead an engineering module and incorporate “art” in the activity. I had the students design a food packaging for the Army which withstands all environments, rough handling, and air drop as well as work and learn about processing and characterization of biodegradable and recycled polymers for packaging. This module addresses solid waste for both the Navy and Army which both include plastics. Alternatives to decrease solid waste is to use biodegradable polymers.

This was with 16 middle school students in each group (there were 4 groups that I performed this module for). This was for the GEMS (Gains in the Education of Mathematics and Science) Army program. GEMS is a summer STEM enrichment program for middle school students held at the US Army Soldier Center where I work.

This activity was implemented as mentioned with approximately 65 students – 32 students/week divided into 2 groups of 16 over two weeks – August 5 – August 15th. There were student mentors (high school students) and my engineering colleagues who helped execute these modules with me. There were different stations. Adjustments were made based on time constraints, instructor observations and student feedback.

I plan to share this experience/process with a group of 10-12 fellow researchers (scientists and engineers interested in implementing STEM activities at my work.

What STEM concepts or learning goals will you and your materials address which can potentially replace other classroom activities? List NGSS and CCSS or your state standards.

The STEM goals can be hands on discovery modules versus just lecture format.

NGSS Standard

MS-PS 1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material.

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?

The implementation of the lesson plan with the mentors/colleagues occurred at GEMS this summer. The next phase of my PD will be to discuss the implementation of the activity with STEM leaders at the Army along with future plans to expand the lesson. There will be no access to computers. The session will last one/**two** hours and be held in a conference room. It is currently scheduled for October 8 at 1:00 pm.

What, in general, will your pre-survey and post-survey ask?

Pre-Survey Questions

Do you incorporate Art into your STEM activities?

What STEM activities do you teach?

Do you teach problem solving?

Do you think ART should be incorporated?

What is your style of teaching STEM?

Are you a scientist or engineer?

Post-Survey Questions

What did you think of the STEM modules?

Do you like how ART was incorporated?

Do you want to try to do this activity with some students?

Do you think the students will learn the module better with or without the art?

What outcomes or expectation do you hope to see for your educators? The goal is to encourage the incorporation of “art” activities” into STEM demonstrations and/or community outreach activities and also teach my colleagues what STEM activities I have been executing at the Army. I hope that I will intrigue another colleague to also implement these activities.

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