

Title: Problem-based learning with 5E and the M in STEM

Why this topic? I selected this topic because students at my school struggle with struggle with using strategies needed to understand and use the four operations to solve real life problems in math. I feel that sharing a 5E lesson with the staff at my school will help both teachers and students.

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

The 5E lesson plan is from the methods STEM Endeavor course. I feel that this is a very useful asset from the Endeavor courses that I have experienced. I would like to share they style of lesson plan with the faculty at my school.

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?

My proposed audience will be teachers K-5 as well as the specialists in my school. There is (1) teacher in Kindergarten, (1) First, (2) Second, (2) Third, (2) Fourth, (2) Fifth, (1) Art Specialist, (1) Media Specialist, (1) Principal, and (1) Computer Specialist. These teachers will all benefit from this PD and the activities presented in the 5E lesson plan and the 5E format. These teachers teach all subjects in their curriculum. Together, they teach roughly 275 students throughout the school.

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.

Common Core State Standard(s): Measurement and Data

- 3.MD.D Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- 8.MD.D Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Standards for Mathematical Practice:

- MP.1 Make sense of problems and persevere in solving them
- MP.2 Reason abstractly and quantitatively
- MP.4 Model with mathematic
- MP.5 Use appropriate tools strategically
- MP.6 Attend to precision
- MP.7 Look for and make use of structure

NGSS:

- 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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?

I will carry out my PD in two 30-minute sessions. This will take place at the school during staff meetings. I will present my PD at staff meeting that will take place next month in October. All teachers attending will have access to computers for the PD session.

Pre-survey questions:

- How would you define STEM?
- Do you currently integrate STEM into your curriculum?
- Do you think STEM should be taught only during our STEM specialist time?
- Are you familiar with the NASA engineering design process?

Post-survey questions:

- Has your understanding or definition of STEM changed?
- Do you plan to integrate more STEM into your curriculum?
- What are some ways that could see yourself integrating STEM into your curriculum?
- Do you plan to use the NASA engineering design process in future lessons?
- Do you plan to use 5E lesson plans in the future?
- What do you like the best about the 5E lesson plan design?

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

I hope that all of the educators will have an open mind in learning about the 5E lesson plans and STEM integration. I hope they will be willing to try at least one 5E lesson plan design this school year.

How will you follow up with the teachers in attendance?

I plan to follow up with the teachers by sending out a quick survey later on in the year to see if they have had a chance to implement a 5E lesson in the classroom. I will also reach out to teachers via email to ask if they need any additional support with forming a 5E lesson plan. I would be willing to support teachers in the development of lesson plan to use with their class.

What data collection methods will you use to analyze the PD's success?

I will use the post-survey questions to help analyze the success of my PD. If the teachers have a better understanding of what a 5E lesson is and how it works, then I will know that the teachers

understood what was being taught. However, if they develop a 5E lesson and implement in their classroom, I will know that the PD was a success.

Reference

<https://www.uen.org/core/>

<http://www.nextgenscience.org/search-standards>

<http://www.corestandards.org/Math/Practice/>

<https://nasa.us-satellite.net/courses/lessons/1342/preview/3031>