REVISIONS IN GREEN

I. *Making a Transdisciplinary Curriculum Action Based and Hands-On*

II. Justification for topic

A. My school, Rose Stein International Elementary, is a newly accredited IB World school. Following the initial authorization, all schools must undergo regular re-evaluations to ensure ongoing quality and adherence to IB ethos. A large part of that ethos is Transdisciplinary teaching and learning. In a transdisciplinary curriculum,traditional subjects are absorbed through projects or learning centers that teachers plan with input from children. The learning experiences should give teachers the opportunity to extend ideas, respond to questions, engage students in conversation, and challenge their thinking (Ozer, 2010). Although there may be excitement for implementing transdisciplinary curriculums for the IBO, many teams and individual teachers feel a deficit in their own efficacy (Lakshmanan, 2011). Teacher self-efficacy coincides with their professional beliefs, which "may play a crucial role in the actual implementation of reform recommendations as their beliefs lead to specific actions in the classroom" (Czerniak, Lumpe, & Haney, 1999).

III. NASA Endeavor Alignment

A. During the resource acquisition segment I will be sharing a list of highly engaging sites, simulations, and data sets from NASA, NOAA, USGS, NMEA, the American Meteorological Society, and more!

B. I will be weaving the standards for NGSS as well as disciplinary core ideas and cross cutting concepts throughout each session

IV. Audience

I propose creating a *intermediate focused* PD that is optional for interested teachers. I will invite grades K-6, however, I want to target grades 3-6 because there seems to be a higher interest in science within my staff. By providing resources at different reading levels I can drive home the idea of access at any age or level. Our classrooms usually have 20-25 students per grade level.

V. STEM Concepts and Learning Goals

A. NGSS

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Crosscutting Concepts

1. Influence of Science, Engineering, and Technology on Society and the Natural World Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.
2. Cause and effect relationships are routinely identified, tested, and used to explain change.
3. Stability and Change- Things may change slowly or rapidly.

B. CCSS

ELA/Literacy -

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (3-5-ETS1-2)

RI.5.1 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (3-5-ETS1-2)

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS1-2)

Mathematics -

MP.2 Reason abstractly and quantitatively. (3-5-ETS1-2)

MP.4 Model with mathematics. (3-5-ETS1-2)

MP.5 Use appropriate tools strategically. (3-5-ETS1-2)

3-5.OA Operations and Algebraic Thinking (3-ETS1-2)

VI. Logistics

A. The session will take place in four increments of 60 minutes. I will recruit my audience with an introduction at a staff meeting, and a signup sent through email. I will advertise my PD session in the lounge, and the Eagle News.

VII. Assessment

A. My Pre-assessment will include questions that determine how teachers are currently synthesizing content for transdisciplinary learning. I would also like to assess their confidence level with the subject, as well as with finding resources.

B. My post-assessment will include many of the pre-assessment questions, but will include checks for conceptual understanding. I will be asking for opportunities to check in with the cohort throughout the year to see how they are implementing the learning.

VIII. Outcomes

A. Teachers should feel more confident in three areas
    1. Transdisciplinary lesson planning
    2. Resource acquisition
    3. STEM integration

IX. Follow Up

A. I will initiate follow up conversations and mini coaching opportunities to support teachers with their ongoing journey.

X. Data Collection

A. I will utilize a mixed methods approach. The quantitative data will be primarily likert scales to determine confidence and knowledge retention. However, the qualitative data will be in the form of impact statements from staff.

Revision (9-25-22)

Upon reading Not Another Inservice by Jenkins and Yoshimura (2010), I would like to take a different approach to my recruitment strategy. I want to build a sense of “readiness” and “commitment from the faculty” (Jenkins & Yoshimura, 2010, p.38). Thus, I would prefer to send out a survey that allows teachers to pick which disciplinary concept they would like more support with.

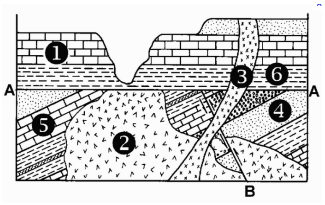
Transdisciplinary planning requires synthesizing subject areas in a way that is authentic and engaging. I would like to give teachers the opportunity to choose which science concepts they would like to work with. I will offer physical sciences, life sciences, earth/space sciences, and engineering/technology/applications of science.

Teachers will be asked: *Which science concept would you like to see synthesized with ELA, Mathematics, Writing, and Social Studies?*

As an example, if the majority of teachers choose Earth/Space sciences I would prepare the following schedule:

A. “5 E” lesson (to take place over two sessions)
    a. Engaging physical phenomena (such as pieces of sedimentary rock that can be touched, studied, measured, and questioned)
    b. Exploratory materials (such as books that hold many answers around geological strata, creation of fossils, and formation of natural wonders)
    c. Opportunities to Explain current understanding (such as an exit ticket, sentence frame, or drawing prompt)
    d. Elaboration opportunities to apply new understanding (Such as elaborating on the significance of geological discoveries as they relate to social issues like religion, resource management, natural disaster

prevention, city planning, and more.) This should be in the second session. Teachers will most likely need to go back and forth between the exploratory and elaboration phase (this should be pointed out).



e. An evaluation will be given to teachers to analyze their understanding (such as a formative check on their understanding of the age of rock layers

B. A reflective session where teachers metacognitively analyze the transdisciplinary nature of the lessons
    a. How did I incorporate ELA, Math, and Social Studies?
    b. How could I have incorporated more of those disciplines?
        i. Vocabulary previews
        ii. Connected read alouds (historical fiction, current publications in geology)
        iii. Measurement of several samples, and following analysis of collected data
        iv. Written performance assessments in the form of news reports, a play from the perspective of a geologist in history, an informational pamphlet for a local strata site, and more.
        v. Engineering a solution to avoid erosion by a housing development, endangered habitat, or other problem. (taking action)
    c. How are IB Approaches to learning being implemented?
        i. Thinking skills, research skills, communication skills, social skills, self-management skills

C. A resource acquisition session

a. Teachers can choose to have a digital list of resources that are applicable at different grade levels, or a physical resource binder (example of digital below)

Disciplinary Core Idea	Resources
Earth and space sciences	https://cimss.ssec.wisc.edu/sage/geology/lesson2/concepts.html https://thewonderofscience.com/standards https://eis.hu.edu.jo/ACUploads/10181/CONTINENTAL%20DRIFT.pdf https://ccgm.org/en/35-world 

I will be responsive to teacher desires for Science Content synthesis. If teachers choose life sciences I will change the lesson materials, but not the structure. I believe that engaging teachers in hands-on labs will encourage them to make use of the 5E model in their own rooms. I would love to plan an additional planning session if teachers want support with their own units.

References

Czerniak, C. M., Lumpe, A. T., & Haney, J. J. (1999). Science Teachers' Beliefs and Intentions to Implement Thematic Units. *Journal of Science Teacher Education*, *10*(2), 123–145. http://www.jstor.org/stable/43156213

Lakshmanan, A., Heath, B. P., Perlmutter, A., & Elder, M. (2011). The impact of science content and professional learning communities on science teaching efficacy and standards‐based instruction. Journal of research in science teaching, 48(5), 534-551.

Özer, Ö. (2010). A case study on transdisciplinary approach of integrated curriculum perspectives of early childhood teachers [M.S. - Master of Science]. Middle East Technical University.