Title: Integrating Engineering into the NGSS

(Will likely change once I start creating the session)

2. I have chosen Option 3, to prepare a professional development session for an online conference, because I anticipate being asked to present again at the NGSS Regional Partnership Series March 8-10th.

3. Based on my past experiences with this conference, I could potentially reach between 60-100 teachers in the region in a 45 min-60 min session. The audience is primarily K-12 science teachers in international schools in the Latin American region, although school admin and instructional coaches are often present as well. Estimating that each primary teacher has 20 students per class, and each Secondary teacher has 100 students total, the impact on student learning could be anywhere between 1,200 - 10,000 students depending on the mix of the participants.

4. A rough summary of my session would be something like the outline below. At each reference to breakout rooms, teachers are invited to self-select if they join the K-2, 3-5, Earth & Space, Life Sci, Physical Sci, Env Sci, Bio, Chem or Physics so they may collaborate with other teachers in their same field.

I. 5 min. Overview of STEM, what it means and the research-based benefits.

II. 15 min A summary of all the different Engineering Design Processes - how to choose one?

a. In breakout rooms groups compare and contrast 3-5 different processes to analyze similarities and differences. Discuss which would be the best age-appropriate process for your students. There is no “wrong” process. (Need a guiding question to drive the investigation)

III. 25 min Show how to relate engineering design process to their science standard, using engineering as the thread that pulls together STEM projects; It can be the vehicle for an interdisciplinary project. Give examples of projects with pictures and videos. Remind teachers to present the provocation without referencing a specific solution. The idea is not for the class to follow step-by-step instructions to create 20 identical catapults. Provide prompts and ask teachers to reframe the activity into a design challenge vs. following step-by-step instructions in the chat box and by unmuting their mics.

a. In breakout rooms, look over the different standards for your subject and collaborate to brainstorm a list of engineering provocations that can relate and even deepen the scientific understandings
b. Or given engineering design challenges, ask which standards they could relate to. (I haven’t decided on the best approach yet, a or b?)

IV. 10 min Recap: The engineering problem could be the phenomenon you're studying or the hands-on project that extends the learning for the unit.

- Reframe the problem, so as not to suggest one single solution
- Favoring projects that use mostly repurposed materials
- Showcase several NASA resources: BEST program among others; Clime Time, CLEAN (need more NASA resources)
- TeachEngineering.org, Science Buddies, Concord Consortium

V. 5 min Q & A

5. The primary desired outcome I hope for my participants is for them to feel confident in ways to integrate Engineering into their existing science units, and to give teachers resources that will help them find provocations and real life challenges to bring to their classrooms.

6. In terms of follow up, we invite participants to fill out a survey on the session at the end. Also, I have assembled a Wakelet to share with participants that serves as a hub for NGSS resources. I have one collection solely on Engineering.