Virtual PD Proposal: STEAM - Visualizing Sound Waves

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STEM Leadership Seminar

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Topic Background

In my 1st grade STEM class, we learn about sound, sound waves, and sound dampening. The course is guided by an acoustical engineering unit from Engineering is Elementary (EIE) by the Boston Museum of Science. The units by EIE follow the engineering design process. Throughout this unit, students learn that sounds are made through vibrations (by feeling their throats, using tuning forks, and making cardboard horns and guitars). I wanted to add a visual art element to this unit, by looking at sound waves.

To complete the lesson, students will record a message using their iPad's voice memo app. They will take a screenshot of the soundwave and create a symmetrical art representation of their message. Symmetry is an area that they study in their art class. Attached to their art will be a QR code so that visitors can hear what the sound wave is representing.

http://d7.eie.org/eie-curriculum/curriculum-units/sounds-fun-seeing-animal-sounds

NASA/Endeavor Integration

This STEAM integration was inspired by the Endeavor course Arts in STEM. There is a natural overlap between art and STEM in visual art and music. Additionally, the final product students create in this activity will include a QR code, for visitors/participants to hear the sounds being represented by a visual sound wave. Participants will engage in the PD asynchronously and collaboratively through Flipgrid. Both QR codes and Flipgrid were elements was learned during the Coding, Robotics, and 1:1 Devices Endeavor course.

PD Audience

This PD will be presented to K-4 resident teachers in our in-house New Teacher Institute (NTI). Resident teachers are currently earning their teaching credentials while supporting a homeroom teacher full-time. At my school, we have STEM and art specialist teachers who teach their content areas. However, upon graduating from NTI, most resident teachers will seek a position as a headteacher where they will also have to teach both science and art.

https://www.townschool.com/new-teacher-institute

PD Logistics

The proposed PD will be asynchronous (as recommended by the NTI program director) with opportunities for engagement and possible synchronous learning. The PD lesson will be pre-recorded, and resident teachers will engage in a pre- and post-PD survey through Flipgrid. Flipgrid will also be an area where teachers can dialogue with one another around the PD. The PD will be advertised through an email by the NTI director. Resident teachers may participate with me at a prescribed time (so that I can moderate questions in real-time) or at their own time. The actual PD content will be between 20-30 minutes long.

NGSS Standards

In this lesson, students will be able to

- Identify some properties of sounds
- Discuss and practice ways to visually represent pitch and volume over time

NGSS 1-PS4-1 Sounds can make matter vibrate, and vibrating matter can make sounds.

Pre- and Post-Survey

Pre-survey Questions:

1. How comfortable are you leading an art lesson?

2. How comfortable are you leading a STEM lesson?

Post-survey/Exit Ticket:

1. (+) What is one thing you want to try right away?

2. (?) What is one thing you would like help with?

3. (Δ) What suggestions or feedback do you have for the presenter?

Outcomes, Expectations, and Measures of Success

Holding an optional PD at this time is difficult. A lot is being asked of us at my school as we juggle hybrid learning with COVID protocols. The recommendation by the NTI Director and Curriculum Director is to create an optional asynchronous PD experience. With the experience, there can be pre-determined times in which I can engage with participants in real-time, or they may participate at their own pace.

The goal of this PD is to art+STEM activities as something that is easily adaptable in their classroom settings. Additionally, technology such as QR codes and Flipgrid are excellent tools to integrate into various subjects and lesson topics.

PD success is measured by attendance and engagement. How many of the NTI residents participated in my PD? We currently have 10 in grades K-4. How many residents plan to recreate the visual soundwave lesson with their students? How many residents plan to use QR codes or Flipgrid in a future lesson?

Follow-up

Since the PD will be delivered in-house, I can follow up with participants via email or google hangout.