

Project Title: All About Arsenic. “Exploring Arsenic and Well Water in Maine Through Citizen Science”

School: Kents Hill School

Grade Level: 9-12

Teacher: J. Cockrell

Project Partners: Who did you work with for this project? Name your mentor and their institution and any other partners.

We worked with Juyoung Shim at UMA.

Teacher Profile: A brief biography of yourself. How long have you been teaching? What did you study in school? What are you passionate about inside and outside the classroom? Why are you interested in the All About Arsenic project?

As an environmental science undergraduate, I knew that my education would be relevant to whatever vocation I wandered into; I did not anticipate that I would continue to develop my environmental consciousness as a teacher. This is the fourth year I have been teaching in independent secondary school. I love the autonomy I have regarding curriculum because it allows me to create engaging courses that can incorporate projects like All About Arsenic! I am passionate about understanding the complexity of all the systems of the natural world and how they are related; I am more passionate about using such study to develop an understanding of spiritual truth. In the classroom, science, and particularly environmental science, is a fantastic way to share the wonder of the natural world. Bringing the ‘human’ elements to science (as the All About Arsenic project does) transforms science from the “classroom/study’ venture, to the “action/reflection/character’ pursuit we humans seem to find ourselves in. Anyways, I also like sauntering in the woods, camping/backpacking, and the music of Phish.

Summary: Provide a 500-word summary of your project. Describe the curriculum. How were arsenic monitoring and data literacy integrated into that curriculum? Provide specifics (# samples collected, what the samples were analyzed for, etc).

Our project could be summarized as ‘safeguarded from any preconceived notions such that it suffered at times.’ The All About Arsenic project was outright grafted on to two environmental science elective courses at Kents Hill School. The fall elective, Ecology of Maine, was introduced to the project, collected 12 samples, and was assigned various Tuva sessions from the content library. The students prepared the collection packets in class. They brought the collection packets with them on their Community Service Day (CSD) trip in October 2019. Students were to inform the community partner for whom they were working with for CSD about the project and request a sample (of course, students had been versed on protocol regarding the collection of the water sample and metadata). Students left magnets and QR codes with the partners and brought the samples/metadata to our next class. The spring elective, Sustainability for the Person and Community (SPC) collected samples at various locations on the Kents Hill campus (12 more samples). SPC students also engaged with Tuva practice assignments, but in preparation for the Kents Hill School Spring Learning Symposium¹, they also completed more refined data literacy assignments; these included the creation of graphs that answered questions created by students that pertained specifically to the Drinking Water Dataset. Other assignments required students to bolster their Learning Symposium presentations by using the Community Engagement

¹ Completed remotely.

Worksheet. Lastly, the SPC students each created a question and data visualization that we collated and presented to the Kents Hill School community as part of the Learning Symposium (I have linked a video of our time during the Learning Symposium in the references section). Students explored how Kents Hill School water samples compared with other SEPA schools; which filter was most effective; what well types contained the most arsenic.

Project Details:

- How many students were in the class that was involved in this project?
 - Ecology of Maine- 14
 - Sustainability for the Person and Community- 4
- Detail specific curricular items such as questions, articles, books, YouTube videos, and labs. It's helpful if you provide links.
 - TuvaLabs
 - All About Arsenic
 - AnecData
- Did you:
 - Collaborate with any other teachers in your school?
 - Collected samples from various faculty members houses on campus.
 - Go on any field trips? Why and where?
 - Community Service Day (see discussion above)
 - Conduct any experiments? What kinds of questions did students ask?
 - Not related to this project anyways...
 - Use your stipend to purchase anything for your classroom? If so, what, and how did you use it?
 - Purchased the two types of containers, parafilm, postage/tape etc.
 - Invite any guests to visit your classroom?
 - Kents Hill School community was invited to Learning Symposium. Many faculty and administrators attended.
- How did you use Tuva, both for the arsenic data and for other datasets?
 - See discussion above.
- How did you plan your community meeting?
 - Where was it?
 - Zoom/youtube because of the pandemic.
 - What did the students do?
 - Presented their SPC data visualization project to the Kents Hill School community.
 - How many people attended?
 - 40ish?
- Include any data analyses your students did.
 - These can be found in the Learning Symposium video linked in the references.

Discussion:

- What did students learn? It's great to include quotes if you have them.
 - The SPC visualization project includes a slide for each student that hold their reflections. I have submitted a PDF copy of the slide-show to accompany this document.
- What did you learn?
 - That the All About Arsenic project is more than worth coherently folding into the content of my elective courses next year!!
- What would you do differently?

- I would dedicate a whole unit to the project; or, at least, work on the project in larger chunks. This year, because of its late addition, I was rather arbitrarily threading it into our course work.

Conclusion: I am so glad I stumbled into this project! The MDI Biological Lab is a gracious host and provides so many great resources that, with more intentionality, I would love to make more use of in future classes. The ‘arsenic in well water’ saga will continue, and citizen science and data literacy are excellent modes of engagement with that story. Again, it is this type of intersection, that of knowing and feeling, that brings knowledge and skills to life- what more could a high school science class ask for?!

References: C:\Users\jcockrell\Downloads\JC_LSYMP.mp4

<..\My Documents\Real SPC folder\REMOTE LEARNING- SPC\Data to Action- KHS.pdf>

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