2023-2024 SEPA Case Study Template

Your Name: Douglas Hodum

Your School: Mt. Blue High School

Grade Level(s): 10-12

Course(s) Taught: Biology, Environmental science, Ecology

Number of Students Involved (Total): 70

Date: 5 April 2024

Name of your scientist partner and their institution, and any other partners:
Jane Disney, MDIBL; Terry Morrocco and Doug Reusch, UMF

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?

I have been teaching for 24 years, nearly all at Mt. Blue High School. I was an independent major as an undergraduate, creating my own major of Environmental Technology (anthropology, environmental studies, math, physics). I went on to earn my MS in Ecology and Environmental Science. I love being outside and keeping fit all year. For the class, I love to see students making connections to the world around them and to understand how interrelated everything is. The "ah-ha" moment is the best time for a teacher. The connections that I hope to help students make are why I am interested in the All About Arsenic project. It allows students to see real issues that could affect our, or other, communities. I appreciate the hands-on component of the bioassays that I can do with my students, from the lettuce seeds, which all of my classes have done, to the Planaria, which my environmental science class is doing.

Abstract: Provide a 500-word summary of your project. Describe the curriculum. How was drinking water sampling, data analysis, and science communication integrated into that curriculum? Provide specifics (number of samples collected, what the samples were analyzed for, how Tuva was used, what opportunities students had to talk about their data through some public outreach, etc…).

I started all of my courses off with the lettuce seed bioassay, using arsenic, copper and iron polluted water. This provided students with a chance to DO actual science, collect data and interpret the data by building graphs on Google Sheets and drawing a conclusion about the worst polluted water. For the environmental science class, they are developing a bioassay to test on Planaria, using movement as a determining factor as to the effect of the individual student chosen pollutant on the flatworms. Unfortunately, student interest was very limited when it came to water samples, with only one student returning the form in time. That means that only two samples were submitted, one from the student and one from a school faucet. Given the small sample

size, we did not undertake any public information component and did not use Tuva to analyze data. All of the students in my classes learned out to create graphs in Google Sheets and draw conclusions based on what their graphs showed.

Details

Did you…

	No	Yes	If yes, how many?
Collaborate with any other teachers in your school? - If so, who and what do they teach?	X	○	_____
Conduct any experiments? - If so, what kinds of questions did students ask? Students looked at how different pollutants affected the level of activity with *Planaria*.	○	X	__6____
Go on any field trips? - If so, where and why?	X	○	_____
Have any guests visit your classroom? - If so, who and why? What did the guest do?	X	○	_____
Have a Community Meeting? - If so, where was it, what did the students do, how many people attended, etc…?	X	○	_____
Have other Outreach Events? - If so, where were they, what did the students do, how many people attended, etc…?	X	○	_____
Use your stipend to purchase anything for your classroom? - If so, what, and how did you use it? I needed to use the stipend to ship the samples to arrive on time and also to make sure I had enough supplies for students to sample water, had more been involved.	○	X	$_____

Describe the student, or group of students, whose work most exemplified the All About Arsenic+ project this school year. What were they excited about? How did that facilitate their learning?

The students working with their own pollutant bioassays were most interested initially in the regeneration of the flatworms. However, once that was completed, they had good questions about different types of pollutants, especially items such as road salt or even gasoline, which might actually end up in a body of water. They were given permission to develop their own protocol after we established a norm for control sample collecting. They always appreciate being able to choose their topics.

Reflect on your students' primary learning outcomes/gains with reference to data literacy, science communication, and using data visualizations in communication. What are they getting out of their involvement in this project?

This project always helps me have all my students work with data, even simple sprout measurements. With that data, every student creates a graph and has to interpret that graph, sometimes on their own and sometimes in a group. For many, this is their first experience using a spreadsheet and generating a graph, making sure it is fully labeled and helps answer a specific question.

How did you use Tuva, for the arsenic data?? Did you use the software for teaching, was it a tool students used to create data visualizations? What about other Tuva data activities? Did you use them in your teaching? Did students build skills using those activities?

I did not use Tuva at all. I rely on having my students generate their own graphs with their own data as well as data collected by other students in my classes.

What challenges did your students have with Tuva, the website, the datasheet, Anecdata, anything related to the project process.

N/A

How did you enhance *your own* Data Visualization and Science Communication skills?

When working with students, they always ask me questions regarding the development of graphs. Sometimes, I have to stop and look into something, such as creating a graph that includes 2 y-axis labels. This helps hone my skills and help me keep in touch with the best way to present collected data.

Which aspects of this project will you repeat next year?

I will continue with the bioassay work, as I think that is a great way to start courses and get students doing lab work, even if it is simple, follow-the-directions lab work.

Which aspects of this project will you change next year?

Next year, I would like to get more students to submit samples. I may also try to increase the concentration of the pollutants to have a more noticeable difference in the seed germination and initial growth results.

List and describe the resources that helped your students the most this year.

The bioassay reminders and resources

Provide a list, and links, if applicable, to specific curricular items such as online worksheets, articles, books, YouTube videos, and labs.

N/A

Add addendums such as curriculum, photos, student assessments, testimonials from parents/students, etc.

N/A

What are anticipated needs for the 2024-2025 school year?

I always appreciate others sharing how they are incorporating this work into their biology classrooms, so any additional shared resources/lesson plans would be great.

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