



Date: April 7, 2026

Your Name: Jessica Lewis

Your School: Nute Middle High School

Grade Level(s):9-12

Course(s) Taught: Physical Science, Forensic Science, CP& Honors Chemistry, and Oceanography

Number of Students Involved (Total): 14 students

Name of your scientist partner and their institution, and any other partners (other partners can include, but are not limited to, collaborations within the school, community groups, non-profit organizations such as the YMCA, or stand out family or friend mentors that helped your project succeed):

Flor Fahnestock-UNH

Jane Disney-MDI Biology Lab

Caitlin Oliver-Olsen-MDI Biology Lab

Ramsey Steiner-Dartmouth

Amy Hudnor-DES

Milton Historical Society & Mrs. Marique

Mrs. Jennifer Leavitt-Nute Middle High School Principal

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? How long have you been participating in SEPA and how were you recruited to participate?

My name is Jess Lewis, and I have been teaching for approximately 16–17 years. I currently teach Physical Science, CP and Honors Chemistry, Forensic Science, and Oceanography at Nute Middle High School, where I have been for the past five years. I earned my Bachelor of Science in Marine Science and Environmental Protection from Massachusetts Maritime Academy. Following 9/11 during my freshman year of college, I enlisted in the United States Coast Guard Reserves and served for six years. After my military service, I worked with NOAA and the Woods Hole Oceanographic Institution. I later returned to my hometown area and worked at Alpha Analytical, an environmental laboratory, where I tested for PFAs and VOCs in soil and groundwater, including work on Department of Defense sites.

Teaching was not originally part of my career plan. However, that changed when I was asked to substitute teach at my father's school, where he was serving as principal. That experience led me to discover a passion for education.

My commitment to learning and protecting the environment has always been a central part of my life. I have worked to serve and protect it through military service, environmental testing, and now through education by helping students understand its importance. I was introduced to SEPA by our school nurse, who encouraged me to apply after seeing a program announcement. I was accepted into SEPA as a first-year participant, and I immediately recognized it as a valuable opportunity for our small school. It allows students to engage in meaningful, real-world science, make connections within their own community, and see the direct impact of their work.

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...). Did students use the **Science Communication Toolkit** and/or Solutionaries Framework to prepare for this outreach event or guide their participation in SEPA this school year? Did students participate in an **Intergenerational Learning** activity (pH exercise etc.)? Please include anecdotes or stories in this section!

I introduced the SEPA project to my chemistry class in early September after being accepted into the program. At that time, I briefly explained that we had been selected to participate in a study that would take place after Christmas break. Throughout the fall, I used that time to thoughtfully plan how to integrate SEPA into our existing curriculum.

At the end of January, I formally implemented the SEPA unit. We had just completed our study of hydrogen bonding, which made it a natural transition into a focused mini-unit on water quality and environmental chemistry. I also knew I had several students interested in pursuing environmental studies in college, so this topic felt especially relevant.

I launched the unit with a real-world case study: the Flint, Michigan water crisis. Students watched a PBS documentary over two class periods, followed by a class discussion. Later that week, they researched current updates on Flint. This immediately captured their interest and set the stage for deeper learning.

I then introduced foundational concepts of drinking water quality through a presentation aligned with New Hampshire standards and regulations, along with guided notes and daily activities. From there, students moved into a hands-on water quality lab that they helped design. They identified several sampling locations within the school, collected and carefully labeled water samples, and conducted 16 different tests. Two locations showed lower pH levels and noticeable odor differences. Because of this, students chose to conduct more precise pH testing. The lab concluded with an analytical discussion and resulted in students writing emails to the principal and facilities manager. This data is now being used to investigate potential piping issues over the summer.

The following week, students were assigned real-world roles based on careers in water quality and environmental science. These included positions such as photographer, videographer, research assistant, analyst, marketing and media personnel, materials manager, editor, data analyst, and researcher. Students selected roles based on their strengths and defined daily responsibilities. During this time, we also explored what SEPA is, who its partner organizations are, and how our data contributes to broader research efforts.

In the next phase, students became curious about local water systems. Their research revealed that the Milton and Milton Mills area contains seven Superfund sites, one of which has a particularly controversial history. This discovery raised new questions about local water safety. Students contacted the New Hampshire Department of

Environmental Services, and Amy from DES provided relevant Superfund documentation. We also invited a member of the local Historical Society as a guest speaker. Plans are now in place for a walking field trip to one of the sites as the weather improves. During this week, students also ordered testing supplies and identified approximately 25 local residences for well testing.

The following week, I introduced TUVA Labs. We worked through one dataset together as a class, and then students independently explored arsenic in drinking water using the platform. This brought us to February break, marking three weeks of work within the mini-unit.

After break, students finalized well locations, assembled sampling kits, practiced procedures, reviewed documentation, and entered data into both our class system and Anecdata. They then collected samples from their own homes and other participating community members. All samples were carefully verified, packaged, and shipped, with students taking full ownership of the process while I served in a support role.

We received the results about two weeks ago. Students were particularly concerned that 6 out of 25 samples showed elevated arsenic levels. This led to broader discussions about community and student health, especially given the number of seizure and Type 1 diabetes diagnoses within our small school population. Several community members reached out to thank the class and shared actions they were taking in response to their results, expressing gratitude for the testing.

Last week, Jocelyn from TUVA interviewed most of the students, with a few remaining interviews scheduled. Students are continuing to analyze their Milton data using TUVA. To conclude our SEPA investigation, students will present their findings to the school board through a slideshow presentation that includes a Q&A session. They will also contribute a newsletter article and participate in a field trip to a local Superfund site.

Details

Did you...

	No	Yes	Where appropriate, how many?
Collaborate with your Scientist Partner? - If so, how? Emails	☐	☒	3
Use the Science Communication Toolkit? - If so, how?	☒	☐	_____
Use the Solutionaries Framework? - If so, how?	☒	☐	_____

Use any Intergenerational Activities? - If so, how? pH Tests	☐	☒	All 25 sampling sites
Collaborate with any other teachers in your school? - If so, who and what do they teach?	☒	☐	_____
Conduct any experiments? - If so, what kinds of questions did students ask? Water Quality Lab-School Sampling Sites -Who decides what the standards and regulations are? -Why does it differ from state to state? - How can we fix this?	☐	☒	7 sampling sites
Go on any field trips? - If so, where and why? Walking field trip to a superfund site to trace out locations in collaboration with our nearby water sources.	☐	☒	In May
Have any guests visit your classroom? How many? - Who and why? What did the guest do? Mrs. Marique from the Milton Historical Society talked to us about the tanneries and the mills that are now superfund sites.	☐	☒	1 guest
Have a Community Meeting? - If so, where was it, what did the students do, how many people attended, etc...? Planning on a few students to conduct a presentation for the school board and community meeting in May	☐	☒	About 25?
Have other Outreach Events? - If so, where were they, what did the students do, how many people attended, etc...? Possibility of having an outreach event this coming August for Open House.	☐	☒	About 50?
Use your classroom award to purchase anything for your classroom? - If so, what, and how did you use it? - I bought all the 25 site collection materials, and I forgot to claim a reimbursement. I did not get a classroom award because they couldn't send me a check. If I did get it, I would use it to	☒	☐	\$0

purchase more collection materials, a good microscope and a dissolved oxygen meter.			
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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? Please include anecdotes and stories here.

The students and I collaboratively developed the curriculum for this mini-unit, which gave them a stronger voice in their learning and allowed them to pursue questions and investigations that genuinely mattered to them, rather than following only what I had initially planned. This approach led to a high level of engagement, as students became deeply invested in exploring issues within their own community. Their questions reflected both curiosity and a growing depth of understanding, and many took initiative to seek out additional information, ask thoughtful follow-up questions, and consider how to effectively share their findings with peers and the broader community. This project provided an effective way to engage a wide range of learners from start to finish. Students with strong academic motivation took the lead on investigations and research, diving deeper into complex questions and extending their learning. Students who typically struggle with some chemistry concepts were able to demonstrate their strengths in meaningful ways that contributed to the overall project. Meanwhile, students in the middle benefited from the flexibility of the structure, exploring areas of interest, collaborating with different peers, and adapting their roles based on the tasks and goals of each day.

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? Please include anecdotes and stories here.

Many of my students in this upper-level class demonstrate strong skills in data literacy and research. They communicate well with one another and do so respectfully, but they often lack confidence in public speaking and can become quite nervous. The upcoming presentation to the school board will be an important opportunity to help build those skills and increase their confidence.

One of the most impactful aspects of this experience was using TUVA Labs—first to explore existing datasets, and then to analyze the data students collected themselves. Our school does not typically have access to platforms like this, and it was incredibly valuable for students to see how data can be interpreted and presented in meaningful ways for a broader audience. Many were especially impressed to see their data displayed alongside that of larger, better-resourced schools. It helped them recognize that their work—something as simple as collecting a water sample—contributed to research at both the state and national level, accessible to people everywhere. This experience was eye-opening for many students, and I am grateful we could provide it. In a community where some students may feel limited in their opportunities after graduation, experiences like this are essential. As a school and as an educator, our goal is to expand their sense of what is possible and help them see that their work and contributions can extend far beyond their immediate surroundings.

If you are a teacher who has participated in both SEPA grants, how have you shifted your teaching to include the additional goals of science communication and intergenerational learning?

N/A

How did you use our Tuva drinking water dataset? Did you use the Tuva 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? Please include stories that illustrate students understanding the link between data visualization and literacy and science communication. If you are a teacher who has participated in both SEPA grants, how have you shifted your data literacy focus to include this grant's science communication goal?

This was my first year implementing SEPA, so I approached it as both a learning experience for myself and an opportunity to explore what my students could do with a platform like TUVa Labs. While my students are comfortable collecting, interpreting, and graphing their own data, they had not previously worked with large datasets or used a platform like TUVa to create and analyze visualizations. I felt this was an important skill for them to develop, as it reflects how data is used and communicated in real-world settings beyond our school.

I began by guiding students through the TUVa activity “Well, Should We Question the Water?” as a whole class. This allowed me to introduce the platform, help them get set up, and model how to navigate and use its features. During this time, students were encouraged to explore freely, ask questions, and identify areas of difficulty. They were especially impressed by the variety of ways data could be represented and quickly recognized how important it is to choose the most effective way to communicate information.

The next activity, “Can Arsenic Be Filtered Out?”, was completed more independently, with less direct instruction. This gave students the opportunity to build confidence and apply their skills on an individual level. Later, students used TUVa again to analyze the data they had collected from their own water sampling. I found that engagement was highest during this phase, as students were personally invested in understanding and presenting their own results. While we initially examined contaminants such as uranium, arsenic, lead, and manganese together, students began to explore additional variables independently as new questions emerged.

I plan to continue incorporating TUVa Labs into my instruction this year, as it has proven to be a valuable tool for building students’ data analysis skills and helping them make meaningful connections between classroom learning and real-world applications.

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

One of the biggest challenges we faced was our unreliable internet connection. It is often slow and occasionally glitchy, and as more students accessed TUVa simultaneously, performance would noticeably decline. As this was my first year implementing SEPA, there was also a learning curve in managing the flow of the unit. Transitions between activities were not always as smooth as I had hoped, and some ideas that seemed promising did not work as effectively in practice. Timing presented another challenge, as we navigated snow days, delays, a school break, and limited class time. However, having gone through the process once, I now have a much clearer understanding of how to refine and better structure the experience moving forward. Despite these challenges, I am incredibly proud of my students and what they accomplished. They met every expectation, stepped into leadership roles, and remained flexible when plans needed to shift. Throughout the project, they demonstrated a high level of thoughtfulness, engagement, and resilience, handling each challenge with maturity and professionalism.

If you did not use Tuva this year, how did you analyze drinking water data? Please explain why you did not use Tuva. What challenges and successes did students experience with your chosen data analysis/visualization tool?

N/A

How did you enhance *your own* Data Visualization and Science Communication skills, as an educator or scientist partner?

As this was my first year implementing SEPA, much of the process felt like relearning the material after our training last fall. There is a clear difference between experiencing something as a learner and facilitating it as an educator. In many ways, I found myself developing the same TUVA-related skills alongside my students. Moving forward, I would like to continue building my proficiency with the platform so I can better support student learning.

At the same time, my own science communication skills have continued to grow as I guide students in interacting with public stakeholders and preparing for their presentation to the school board.

Science Communication Outreach

What kinds of science communication outreach products did your students produce?

My students communicated extensively with local residents and community members, including sending emails to invite participation in well testing and providing clear information about how and where to access results. They also contributed articles to the school newsletter and created content for the school's social media platforms to share updates on their work.

As a culminating activity, they are developing a slideshow presentation for the school board meeting in May, which will include a question-and-answer session. In addition, our principal has suggested that students showcase their work through a booth at the school's Open House next August.

Did your students work with the Science Communication Toolkit this year?

No

If yes, please describe how it went. What worked best? What improvements could be made?

Please include anecdotes or stories here. If you did not use the Science Communication Toolkit, why not? What other resources and activities did you use to teach or facilitate science communication? Did the science communication skill building inspire outreach or build capacity in your students in ways not directly associated with the SEPA project?

We did not use this resource this year, as we ultimately ran out of time to explore and implement it effectively. Instead, students have been focusing on developing a slideshow presentation for the school board this May. This presentation will highlight the full scope of their work throughout the ongoing project, including their findings, where the data will be shared, and how community members can access additional information.

Don't forget to add all final student products to your teacher folder on the shared google folder! (Feel free to add additional products that led to the final products. Simply create a separate folder under your teacher folder.)

Intergenerational Learning

Did you send an intergenerational activity home to parents? **Yes**

If yes, please describe the activity. What are stories and anecdotes you can include about student participation in intergenerational learning activities?

We incorporated this into our water sampling kits, with students conducting pH testing at the same time they collected their water samples. Most samples were taken at students' homes, which allowed family members to review the datasheet as the sampling took place. Many students noted that they needed to explain what pH is and address common misconceptions, helping residents better understand how pH levels can positively or negatively impact drinking water quality.

If no, please describe why. What other resources or activities did you use to teach about or facilitate intergenerational learning?

What worked best? What improvements could be made?

My students already had a strong understanding of pH, which gave me confidence in their ability to explain the concept to others while conducting testing at home. Including the pH test within the sampling kits proved to be effective, as it kept all materials and documentation organized in one place and allowed the process to be completed efficiently in a single visit.

Did the intergenerational activity go home at the same time as the drinking water samples? Yes
Please explain.

Students felt it was most efficient to have all materials organized into a single kit and to complete all testing at the same time, particularly for those collecting samples from community members' wells rather than their own homes.

What feedback did you hear about the activity?

Community members did offer helpful feedback, including the suggestion of hosting an informational session prior to testing. This could better prepare participants for the questions on the forms and ensure they have the necessary materials ready for students during sample collection.

Solutionaries Framework

Did you use the Solutionaries Framework in your class? **No**

If yes, please describe.

N/A

What worked best? What improvements could be made?

N/A

If no, why not? Please include other activities or resources you used to teach about or facilitate systems thinking, placed-based discovery, or project-based learning.

We did not use this resource this year, as we ultimately ran out of time to explore and implement it effectively. Instead, students shaped the mini-unit into their own, incorporating formative and summative assessments where they felt they were most meaningful. This student-driven approach fostered strong voice and choice while still supporting meaningful content and conceptual learning.

Did you attend the Institute for Humane Education series on the solutionaries framework in your class?
No

Which aspects of this Communicating Data project will you repeat next year?

I feel that the positions that were created by the students gave them a voice and that helped with them being able to effectively communicate data with their classmates, residences, and hopefully the community and school board at the meeting in May. I would like to see this continue for next year.

Which aspects of this project will you change next year?

I will change the timing and smooth out transitions from one item to the next. I would also like to add in an information session on how samples will be collected and what kind of forms would need to be completed for the community before students head out to test the well.

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

- **Milton Historical Society:** A representative visited our class to share the history of the town, including the origins of the local Superfund sites.
- **New Hampshire DES (Amy Hudnor):** Provided official reports on the town's Superfund sites, allowing students to further investigate and analyze local environmental concerns.
- **TUVA Labs:** Enabled students to see their data as part of a larger, real-world dataset, helping them analyze results in real time and understand the impact on local residents.
- **Nute Middle High School (Andy Rawson, Facilities Manager):** Offered insight into the school's infrastructure, helping students understand how factors like piping and water sources could influence test results.
- **Milton Water Facility:** Served as a resource for students to research the town's water system, including sources, treatment processes, and water quality testing practices.

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

Please refer to Lewis's folder, which includes presentations, assignments, labs, photos, videos, student reflections, and parent and staff testimonials.

Add addendums such as stories and anecdotes, photos, student assessments, testimonials from parents/students, etc.

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What were gaps or barriers you experienced this year?

Time management was a significant challenge for me during this project. The pacing did not always align with my expectations—some activities required more time than anticipated, while others took less. In reflecting on the experience, I believe this mini-unit could have been expanded into a longer, more immersive experience, potentially serving as a two-month unit integrated into or temporarily replacing the traditional curriculum.

What are the anticipated needs for the 2025-2026 school year?

Moving forward, key needs include increased community involvement, additional informational sessions for the public, and improved flow and transitions within the classroom. More time for planning would help strengthen the pacing and cohesion of the unit. Additionally, expanded resources—such as more sampling supplies, additional testing strips, and a dissolved oxygen meter—would further support the quality and scope of student investigations.

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