

Project Title: All About Arsenic

School: Mount Desert Elementary School

Grade Level: 7/8

Teacher: Sarah Dunbar

Project Partners: Jane Disney, MDI Biological Laboratory
Hannah Lust, MDI Biological Laboratory

Teacher Profile: Sarah Dunbar is a middle school science teacher at Mount Desert Elementary. Sarah received a bachelor's degree in Elementary Education and a Masters degree in curriculum and instruction with a focus on science education from University of Massachusetts. She is in her 13th year of teaching. Sarah looks for learning opportunities that inspire and motivate her students to have an impact. The All About Arsenic project provides a learning platform for students to inform and educate their community about the health effects of arsenic in drinking water.

Summary:

The 7th and 8th grade at Mount Desert Elementary School participated in an arsenic investigation.

This project had three parts:

1. Classroom Investigation
2. Well water testing
3. Community outreach and advocacy

Middle School Science Practice Standards:

MS.S.1-SEP-Asking Questions and Defining Problems

MS.S.3-SEP-Planning and Carrying Out Investigations

MS.S.8-SEP-Obtaining, Evaluating, and Communicating Information

MS.S.5-SEP: MS.S.5-SEP-Using Mathematics and Computational Thinking

1. Classroom Investigation
Data to Action [Lesson plan](#)

The students started the project by researching arsenic. The purpose of this project was to become “experts” in a subtopic about arsenic. The classes brainstormed what was most important for them to learn about arsenic so

that they could be community advocates and help educate their community about arsenic. Groups researched and presented on topics like:

What is arsenic?

What are the health impacts of Arsenic exposure?

What do you do if you have high levels of arsenic?

Why do we have high levels of arsenic in Maine and New Hampshire?

What is the history of arsenic?

How does arsenic get in well water?

Understanding the issues regarding arsenic in well water provided a springboard for what their classroom investigation would look like. The groups brainstormed what they wanted to investigate. The group decided to continue the filtered water bottle investigation the class of 2020 started.

Students conducted a classroom investigation on the effectiveness of filtered water bottles in filtering arsenic contaminated water. Students used three water bottles for this study, they ranged in price and types of filter.

The Grayl Ultralight purifying water bottle which cost \$70

https://www.amazon.com/gp/product/B07YNR2YB6/ref=ppx_yo_dt_b_asin_title_o03_s00?ie=UTF8&psc=1

The Geekpure Collapsible Water bottle that cost \$20

https://www.amazon.com/gp/product/B07YNR2YB6/ref=ppx_yo_dt_b_asin_title_o03_s00?ie=UTF8&psc=1

The Zero Water Tumbler which cost \$11

https://www.amazon.com/gp/product/B012CEY1H4/ref=ppx_yo_dt_b_asin_title_o03_s00?ie=UTF8&psc=1

Students looked to answer a range of questions about the water bottles.

Does the cost of the water bottle impact the effectiveness of filtering arsenic?

The Zero Water tumbler does not claim to filter arsenic. Will it filter the arsenic like the Zero Water pitcher?

After conducting their experiment students wrote scientific reports about their findings.

8th grade students also looked at Remy Babich's data. Attached is the lesson plan for that activity. Zebrafish Data [activity](#)

2. Students collected water samples from their own homes and we offered samples to MDES families. We sent 9 samples to be analyzed. They were able to analyze and interpret the data for arsenic in well water in the town of Mount Desert.
3. Advocacy- 7th and 8th grade students were given the opportunity to present testimony for the Maine legislature health and human services committee in support of LD 1891. For me this was an important next step in this project. My students felt a sense of pride in the work that they did. They also worked incredibly hard on their testimony knowing they had an authentic audience. My students were thrilled to hear the bill was moved forward with an amendment to increase the funding. [Video Link](#)

Project Details:

- How many students were in the class that was involved in this project?
43 students in grades 7 and 8
- Did you:
 - Collaborate with any other teachers in your school? yes
 - Go on any field trips? No
 - Conduct any experiments? What kinds of questions did students ask?
Water bottle investigation
 - Invite any guests to visit your classroom? My class worked with Sergio and Isi from Defend our Health in preparation for their testimony,
- How did you use Tuva, both for the arsenic data and for other datasets?
For the 7th graders who were new to Tuva we started the year with learning how to navigate Tuva. We used the Disney vs. Pixar data set as a way to explore possible questions and features that Tuva has to offer. Both 7th and 8th grade used Tuva to analyze the results from our local well water testing. The 8th grade also used Tuva when participating in the zebra fish activity.

- How did you plan your community meeting?

We did not have a community meeting this year but several of my students presented in front of the Maine Legislature Health and Human Services committee in support of a proposed water quality bill.

Discussion:

- What did students learn? They learned a lot about water quality, data analysis, and arsenic. They also learned that their voices can be heard and that they have knowledge to share that adults and elected officials didn't know. They learned that their voice matters.
- What did you learn? I learned a lot about advocacy and the power of student voice. My students worked very hard on their testimony and it was received very well.
- What would you do differently? I would like to find a way to get more samples back from the public. We had a very low sample return this year, which is different from past years.

Conclusion:

I was so thrilled my students were given the opportunity to present to the Health and Human services committee. The timing worked perfect and they were able to share their knowledge with the committee. I was a little disappointed that we did not collect many samples this year. This is my third year with the project at this school. I am not sure if that is part of the issue or if it was not something people were interested in right now. We sent a lot of tubes out but we did not get many back. I am interested in continuing this work next year and trying to collaborate with the town for collecting samples.

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