

3-8-19 Teaching is the Best Way to Learn

You know what they say about learning; the best way to learn is to teach. I had the pleasure of learning while teaching last week. I was invited by Halifax Elementary School's sixth grade teacher, Mrs. Lisa Whitney, to talk about the ponds and anything related to them. I decided to focus on two things, which is difficult with a complicated topic. First, I wanted them to know how much progress has been made with septic systems, especially around the ponds. So, I would tell them about the required testing for E. coli at all public and semi-public beaches from Memorial Day to Labor Day. Secondly, I wanted to talk about pollution and its effect on all the waters, as they are all connected.

Rather than just talk, talk, talk, I wanted to interact and have some fun. Explaining the weekly summer testing for E. coli allowed me to bring in props. Got to have props to keep the audience awake! I showed them my chain of custody form, my field data form, the cooler, the thermometer, the sample cup and my favorite barbecue tongs for holding the sample cup. Best of all, though, were the waders. After describing how to take the sample, (walking slowly, so as to not stir up the bottom, walking out to my knees and slowly dipping the sample cup down to about 6 to 12 inches below the surface, avoiding going near the bottom, over and back up again), I asked the class, "Would anyone like to put on the waders and demonstrate how to properly take a sample of pond water?" Almost everyone wanted to.

It was fun watching the students walk slowly into the invisible pond and dip the cup into the invisible water. (They had been listening!) Each student in the four classes smiled with this accomplishment. I think I met some future scientists and some actors!

Watching the students in the waders was a tough act to follow, so I had to take a deep breath and hope my pollution demonstration was not too lame. My props were a cafeteria tray (They have not changed in decades!) representing the ground, a blue piece of paper representing ground water and a cardboard egg case representing many things, such as a septic tank, or a septic system leaching area, or a whole pond.

Then, the class was invited to form a half circle around me to watch as I poured water into one section, saying "Water is very powerful. It will continue to flow as long as it needs to; nothing will stop it. This is like a heavy rain storm right

here in this corner but watch the water flow and fill all the other sections.” Then the “rain storm” stopped.

Next, red dye was poured into one corner. It began to flow into the other sections all by itself without any assistance. I told the students that in public health we often hear the saying, “Sometimes Dilution is the Solution to Pollution.” They liked that, exclaiming, “Hey, that rhymes!” I had no idea going into this demonstration how useful this phrase would be. As they asked questions, though, I could remind them of key words, such as “Sometimes” (What if a small amount of something was highly toxic?”)

The spreading red dye showed the process of diffusion, where all the molecules move until stasis is achieved. I compared it to someone spraying perfume in one corner of the room and it smells really strong at first. Then it spreads to the rest of the room and the smell is not so strong. Stasis had been achieved. I told them the flowing red dye is what happens with pollution. It will spread as it joins the water. The more pollution there is, the less likely that any dilution can happen. The less pollution we add, the better chance dilution has.

As the red dye was slowly flowing, I added a little ground flax seed to the same corner where the dye was poured. It took off with the movement of the dye and flew from one end of the egg case to the other immediately! I asked the students to think of the flax seed as other pollutants, such as E. coli.

While we talked, they noticed something happening to the egg case. It was becoming saturated and the red dye was leaking out, even though not much had arrived on the surface at the other end of the case. The red dye was staining the blue paper representing the groundwater! This was a significant moment.

They were beginning to understand the concept of ground water and they had learned that day that Halifax’s drinking water comes from wells tapping into ground water. Before they learned that, every class guessed our water came from the ponds. The second guess of every class was the water tower.

Some students knew about Brockton’s use of the Monponsett Ponds.

Many students had been told the ponds are not safe for swimming.

I hope all eighty-seven students will talk to their parents about pollution and how preventing it protects our groundwater. We did talk about phosphorous feeding the algae and that people need to decide if it is worth it to use it on their

lawns. Children are not only learners; they are also great teachers, capable of transforming a whole society.

Thank you, Mrs. Whitney, for the invitation. It was an honor and a blast!

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