the stars challenge

# Explore Biotechnology

Fall 2013

Our voyage around the laboratory allowed us to experience many aspects of biotechnology. It began with the task of familiarizing ourselves with high tech lab equipment. Then, we studied DNA in depth. Reviewing the structure and function of DNA helped us understand it better when we extracted it from fruit and even ourselves! We then investigated the creation of a DNA fingerprint using gel electrophoresis. However, our expedition was just beginning.

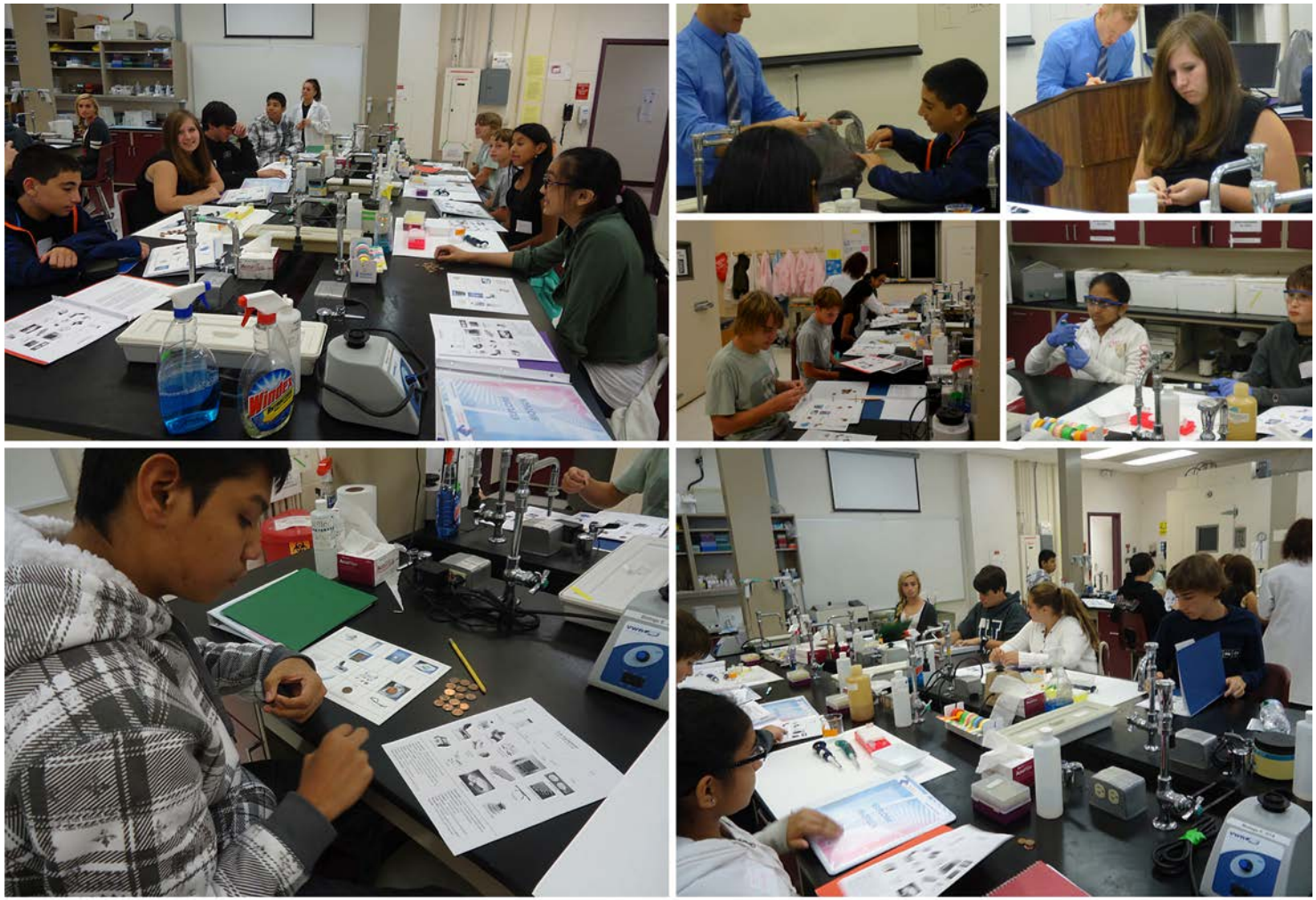
We began applying these techniques and technologies to our microbial studies. While learning about viruses, we compared the DNA fingerprints of 3 viral strains. We genetically engineered bacteria to have a trait that it didn't normally contain. After hunting for microbes and exploring the spread of disease, we came up with ideas for our own genetically modified organisms that could somehow help humanity.

Ultimately, our capstone experience combined many of these techniques in an intense laboratory experiment. Samples of food were brought in to determine if any of the ingredients (namely corn or soy) were genetically modified. We completed this by extracting DNA from our samples, amplifying this DNA using a technique called Polymerase Chain Reaction (PCR), and using gel electrophoresis to create DNA fingerprints. These DNA fingerprints were then analyzed in order to determine if any of the DNA came from a genetically modified plant.

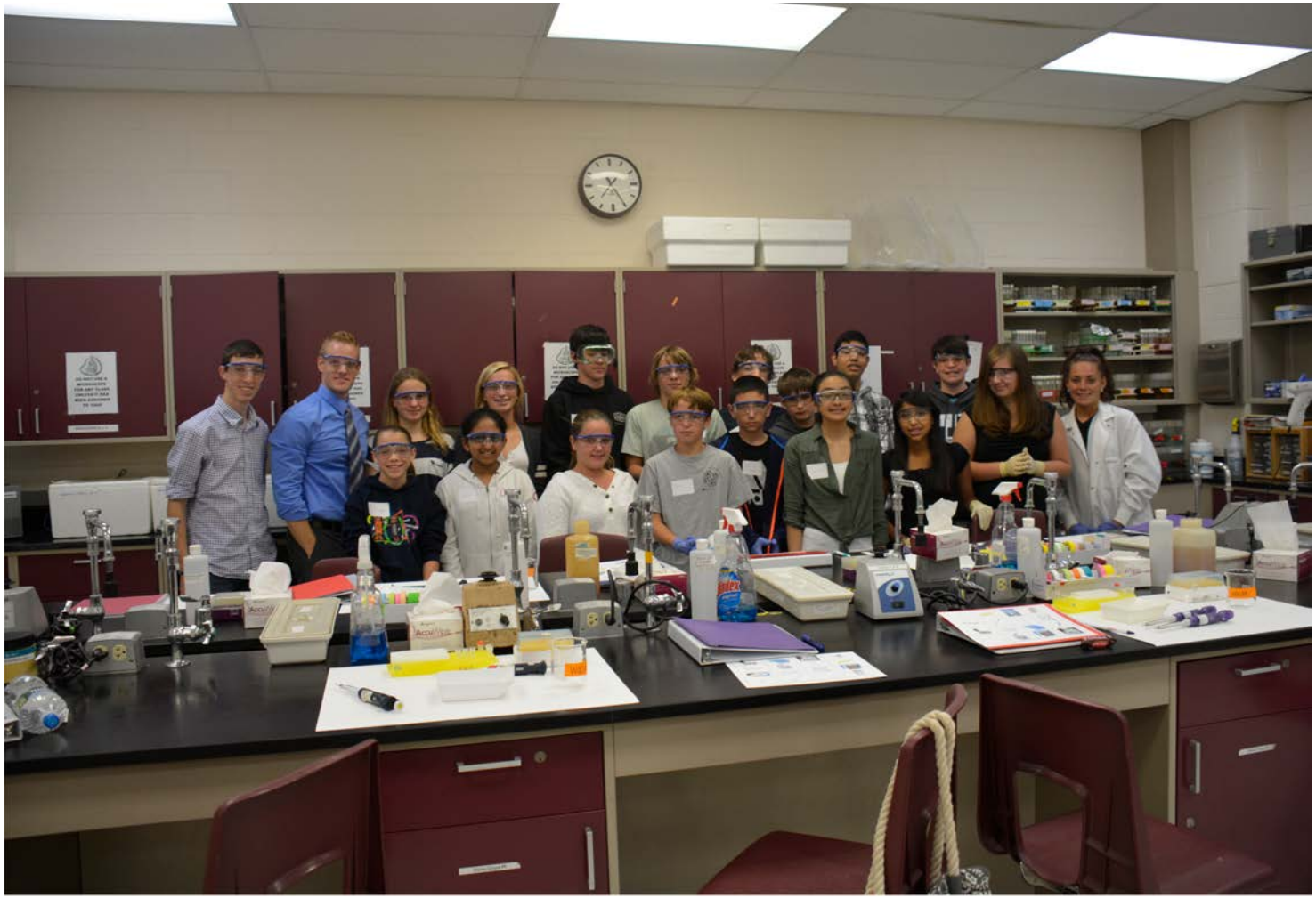
Biotechnology has the potential to help us discover new ways to approach problems that have existed for many years. I encourage you to share your knowledge and continue exploring biotechnology since the journey has only just begun.

It has been an absolute pleasure to be able to share my passion for biotechnology with all of you!

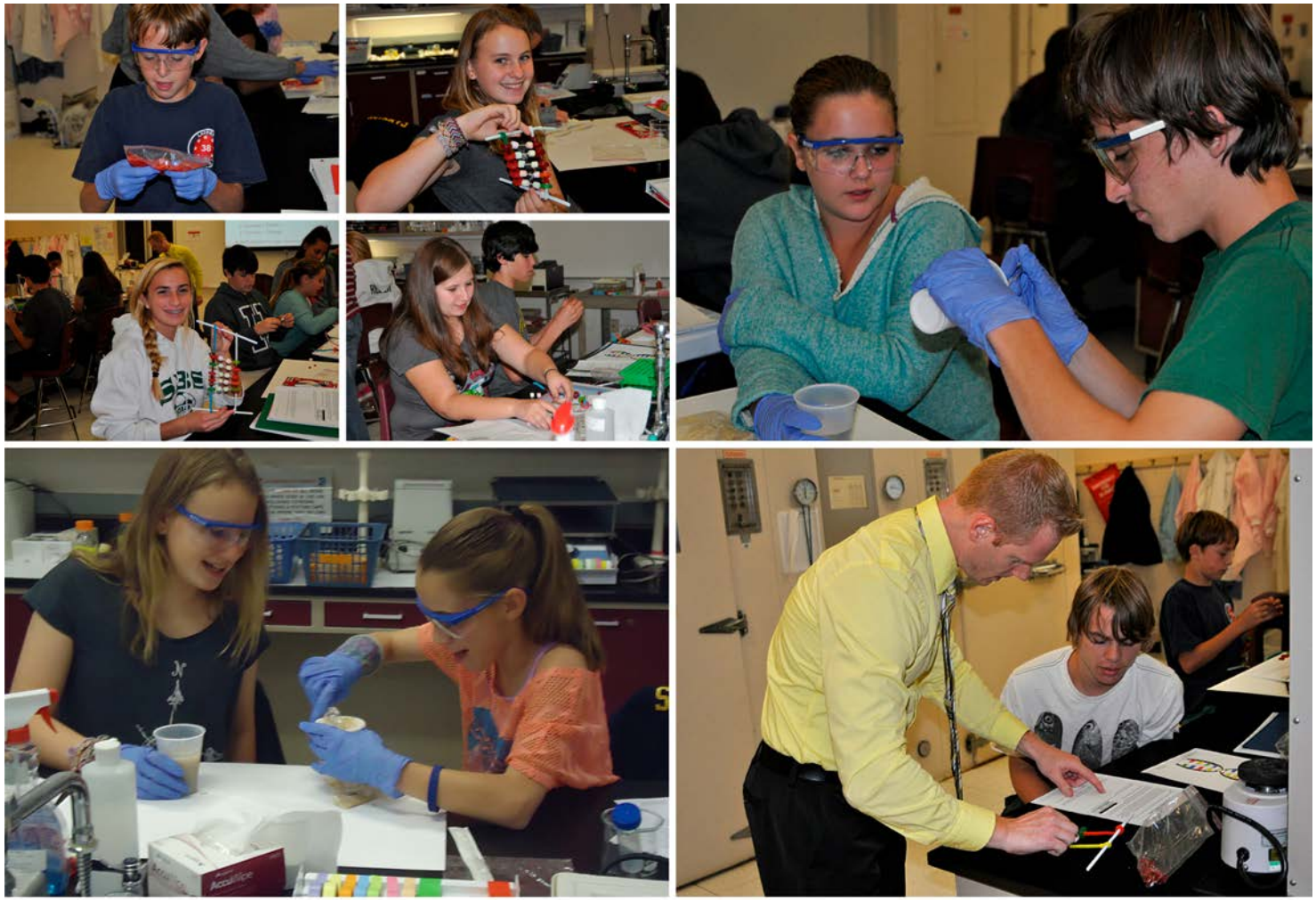
Mr. Fusco



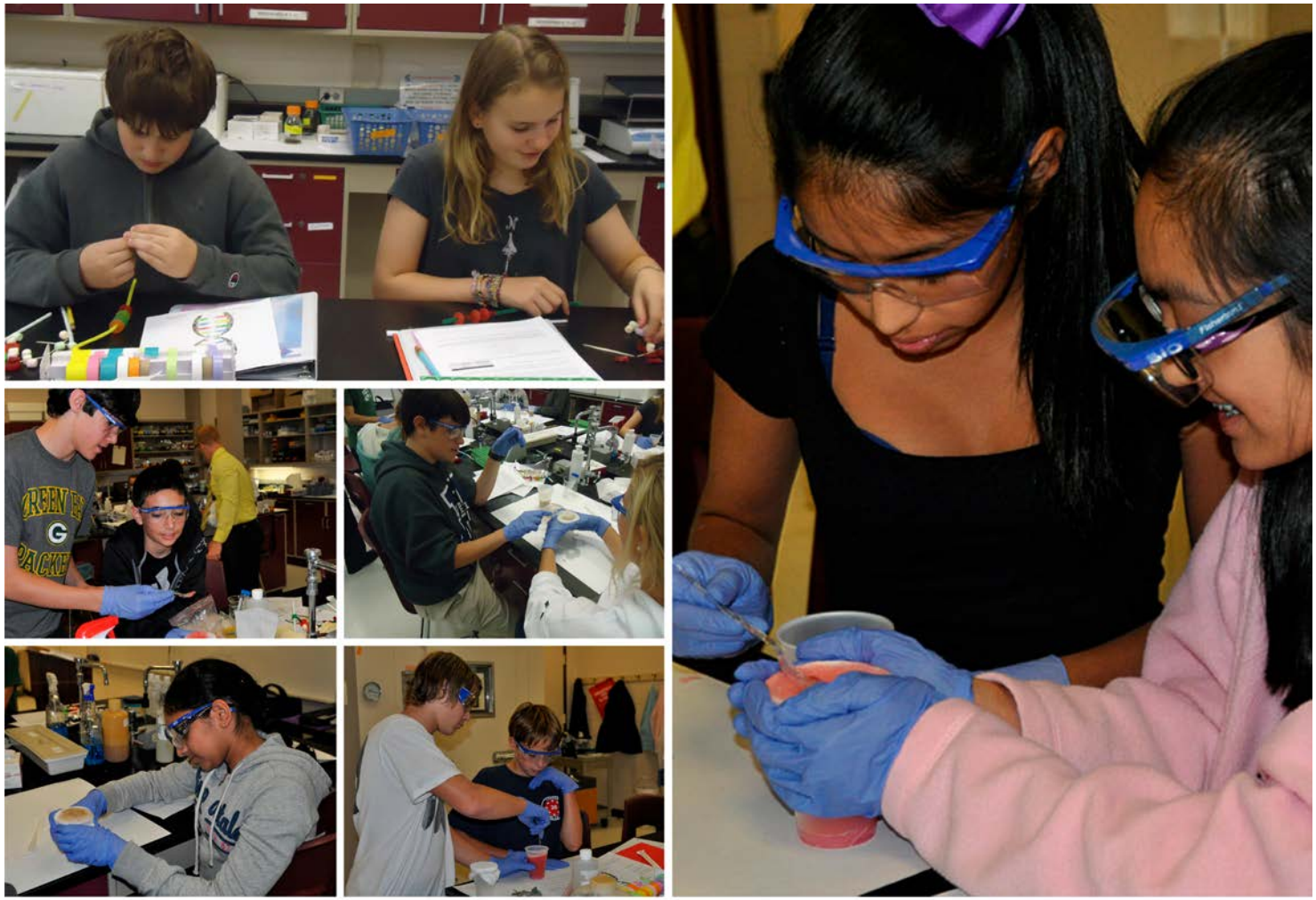

BINGO! Our exploration began with identifying lab equipment that we'd be using throughout the course, focusing on the proper use of the micropipette.



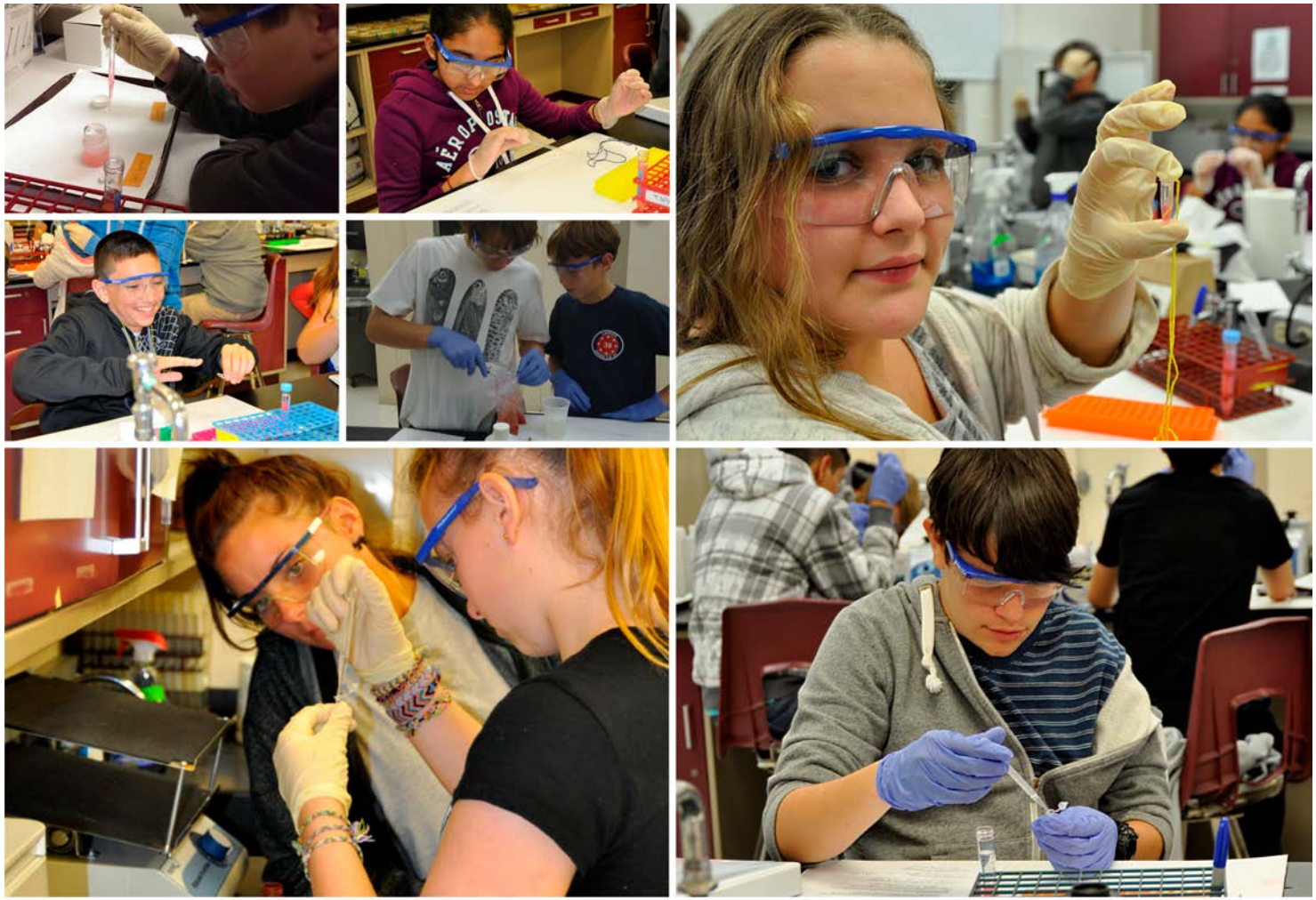
A picture of our entire group including Andrew and Melissa (our TAs).



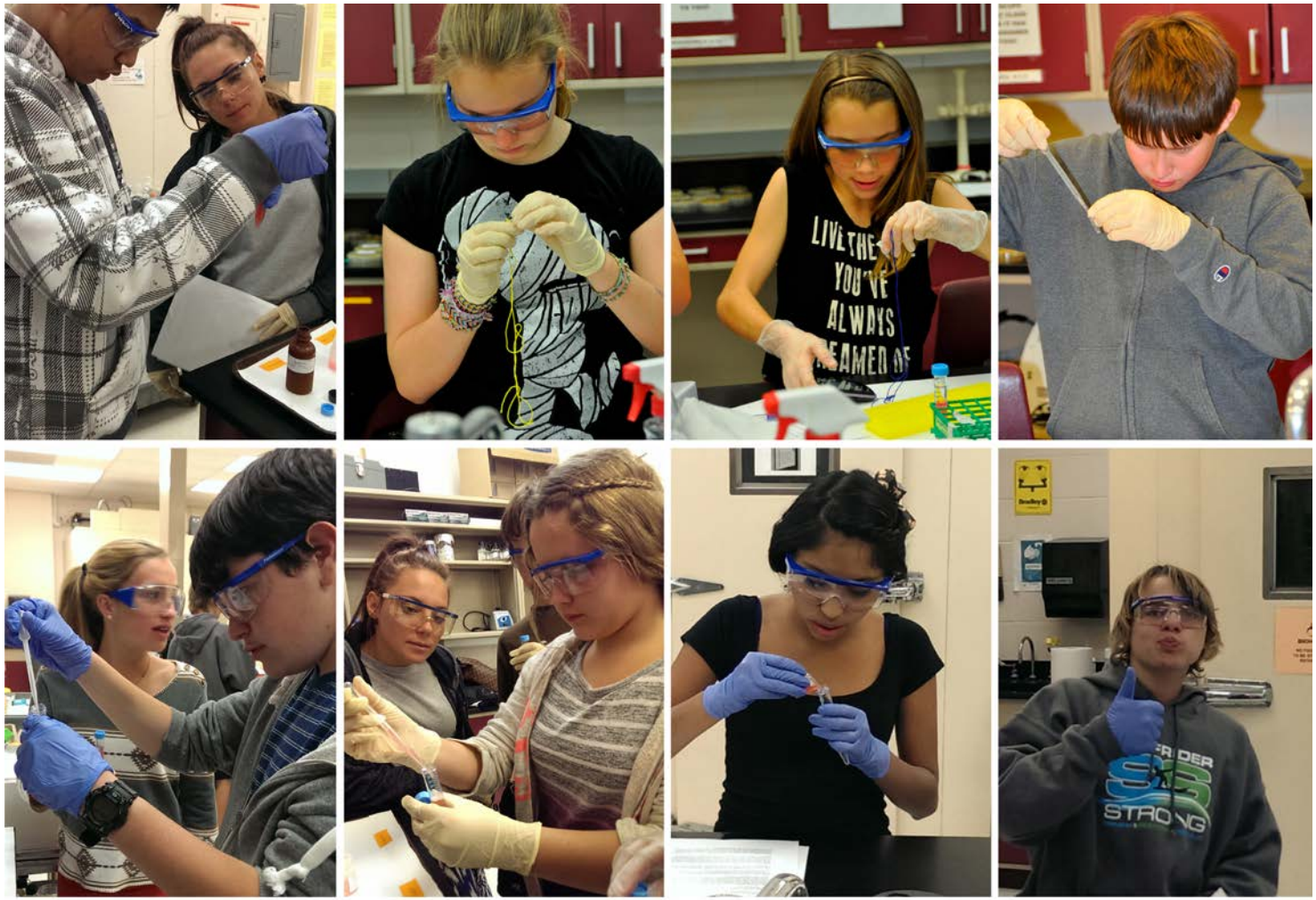
Learning about DNA was fun as we made candy models of the double helix. But it was more exciting to extract DNA from bananas and strawberries.



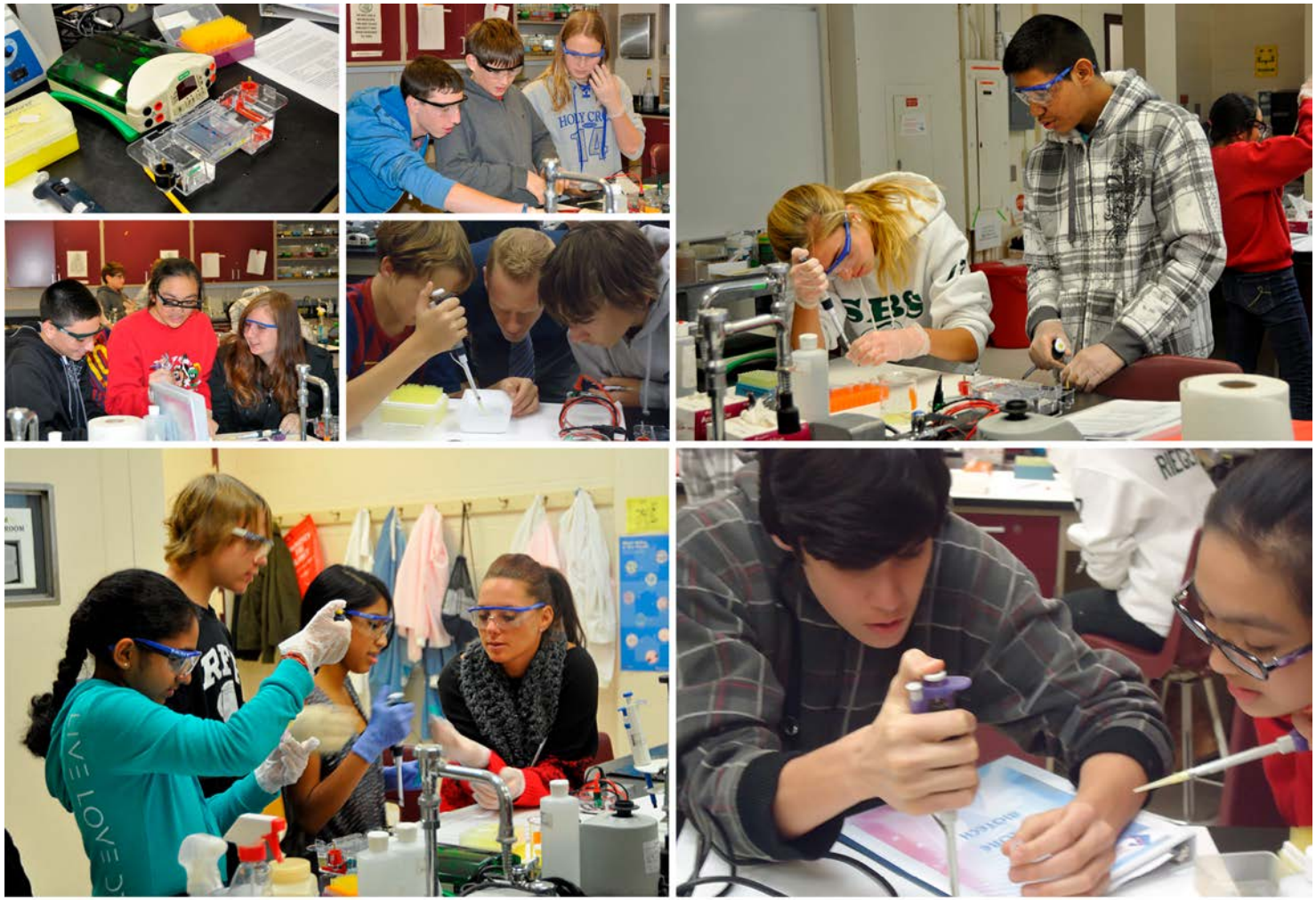
Who knew that we could use household items like salt and soap to extract DNA?!



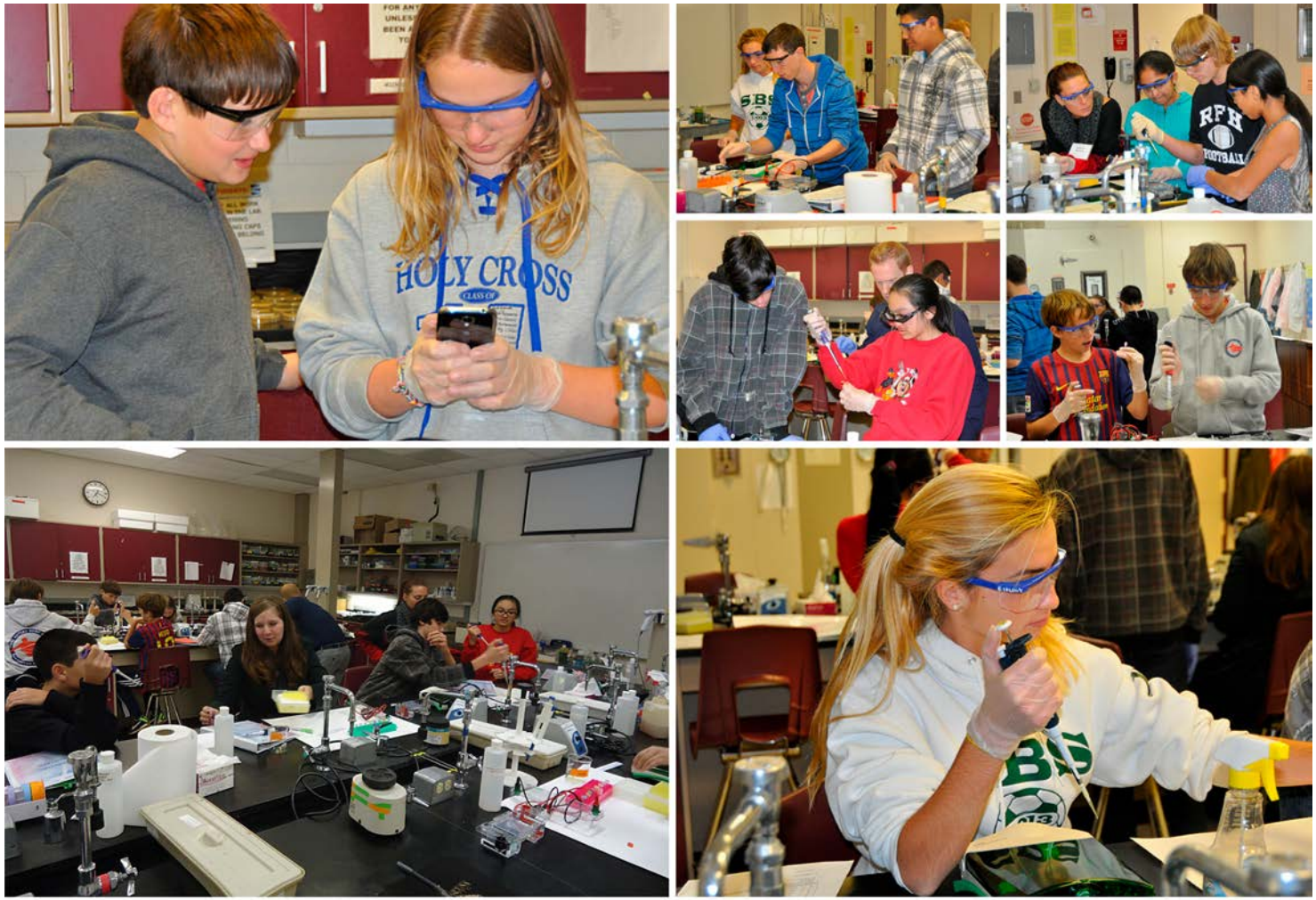
Then we were ready and able to extract our own DNA!



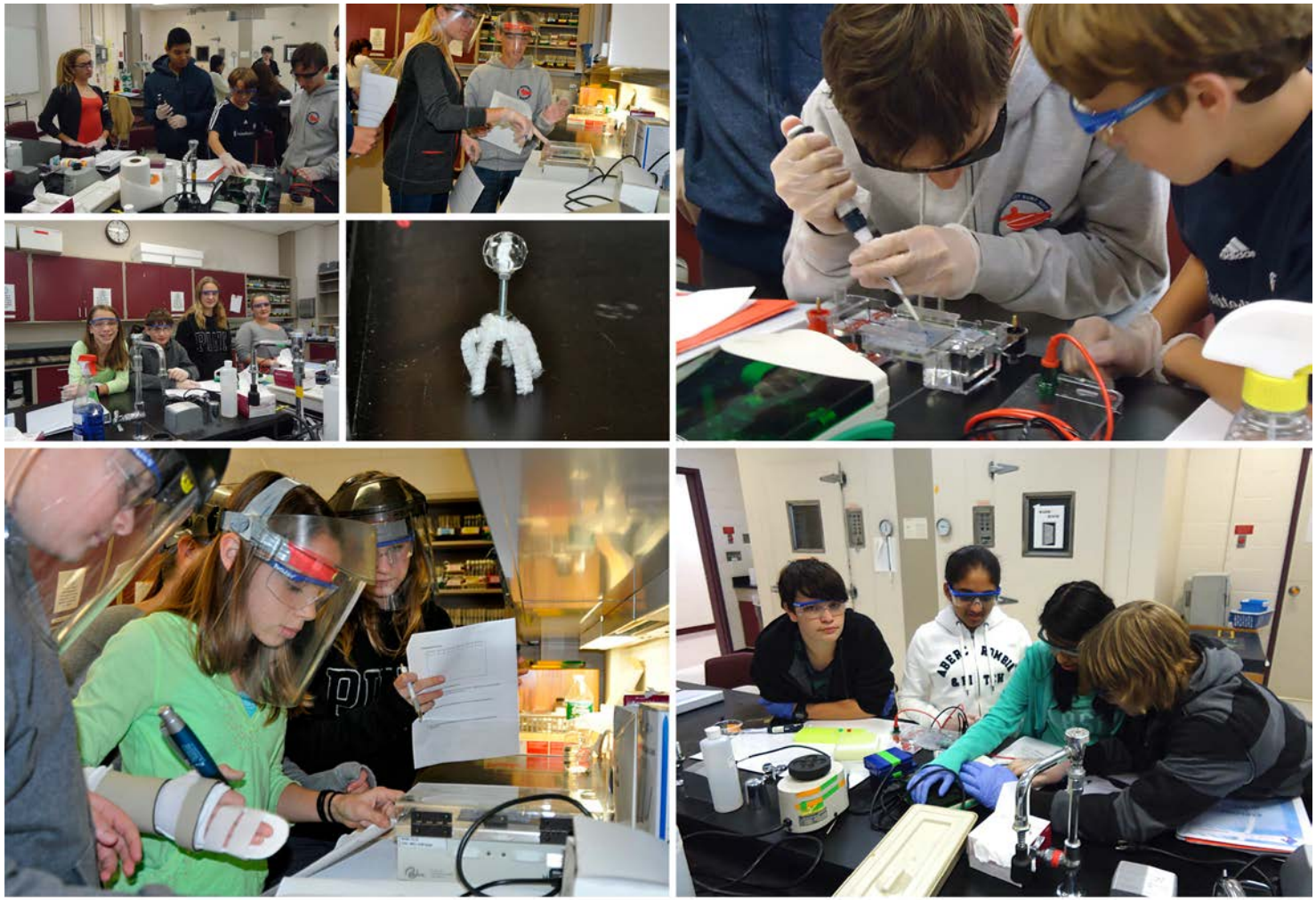

Using Gatorade and a few simple chemicals, almost everyone extracted DNA from his or her own cheek cells!



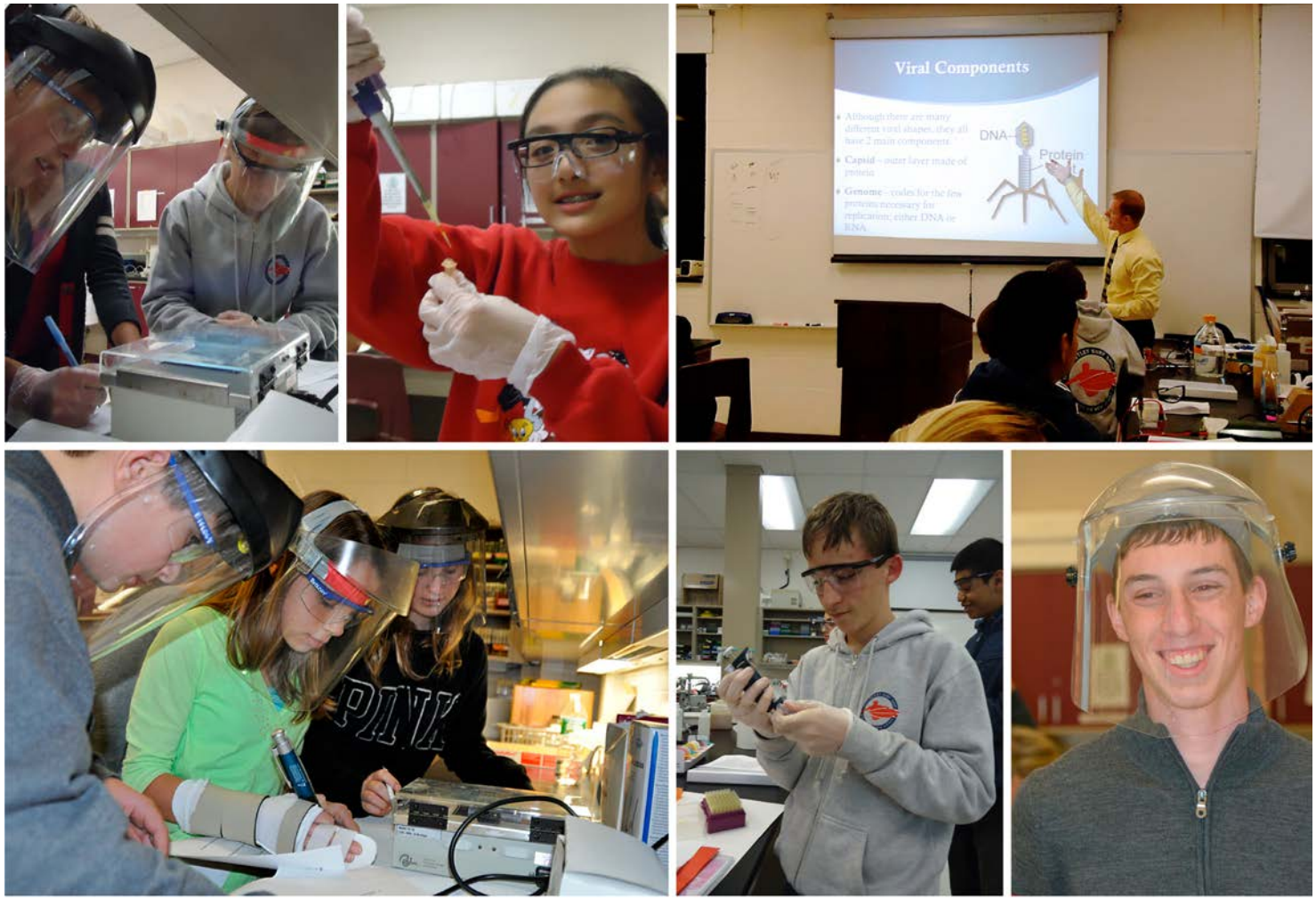
Our journey next took us to the land of gel electrophoresis!



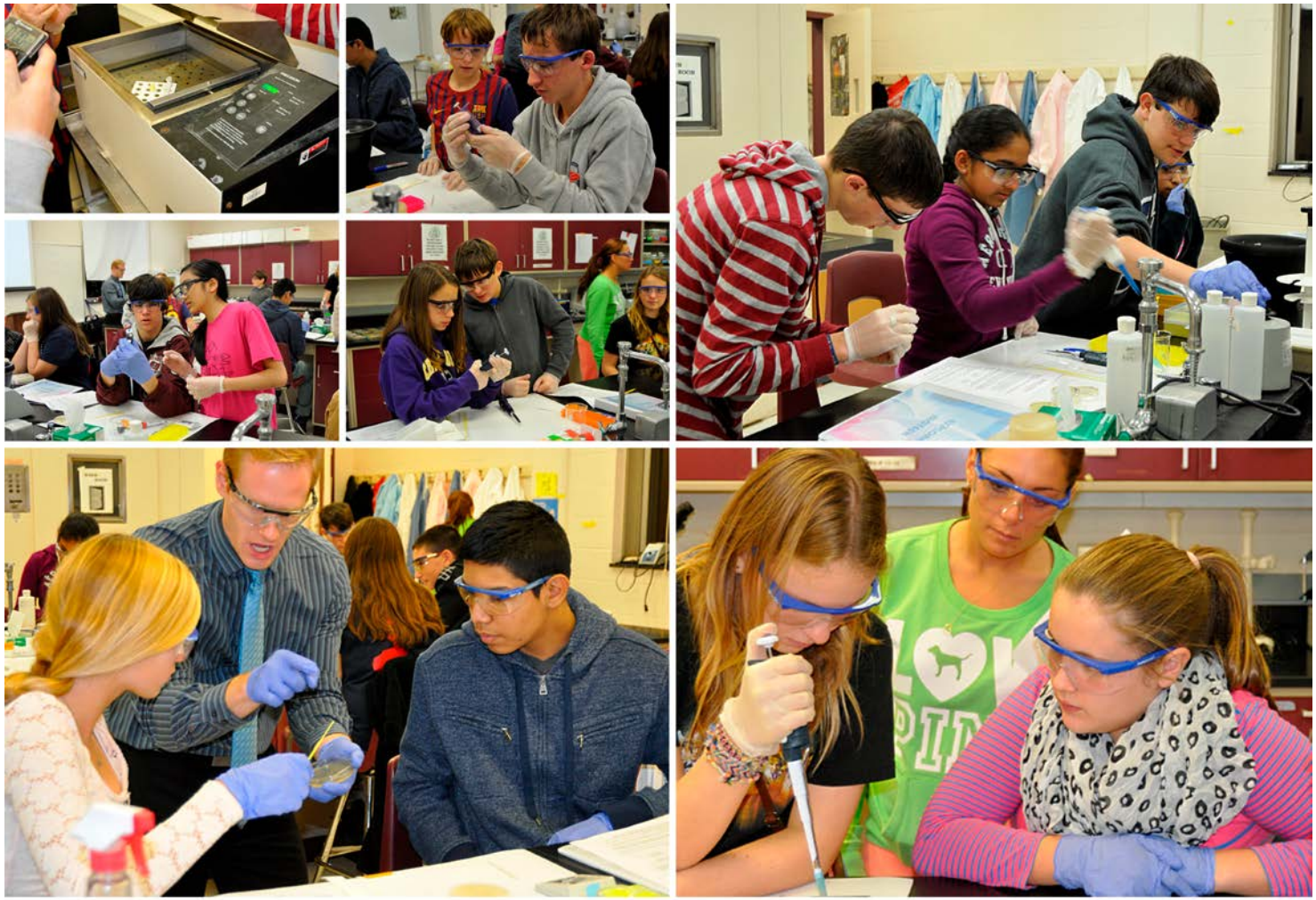

Using colored dyes, we learned how molecules can be separated by size and charge.



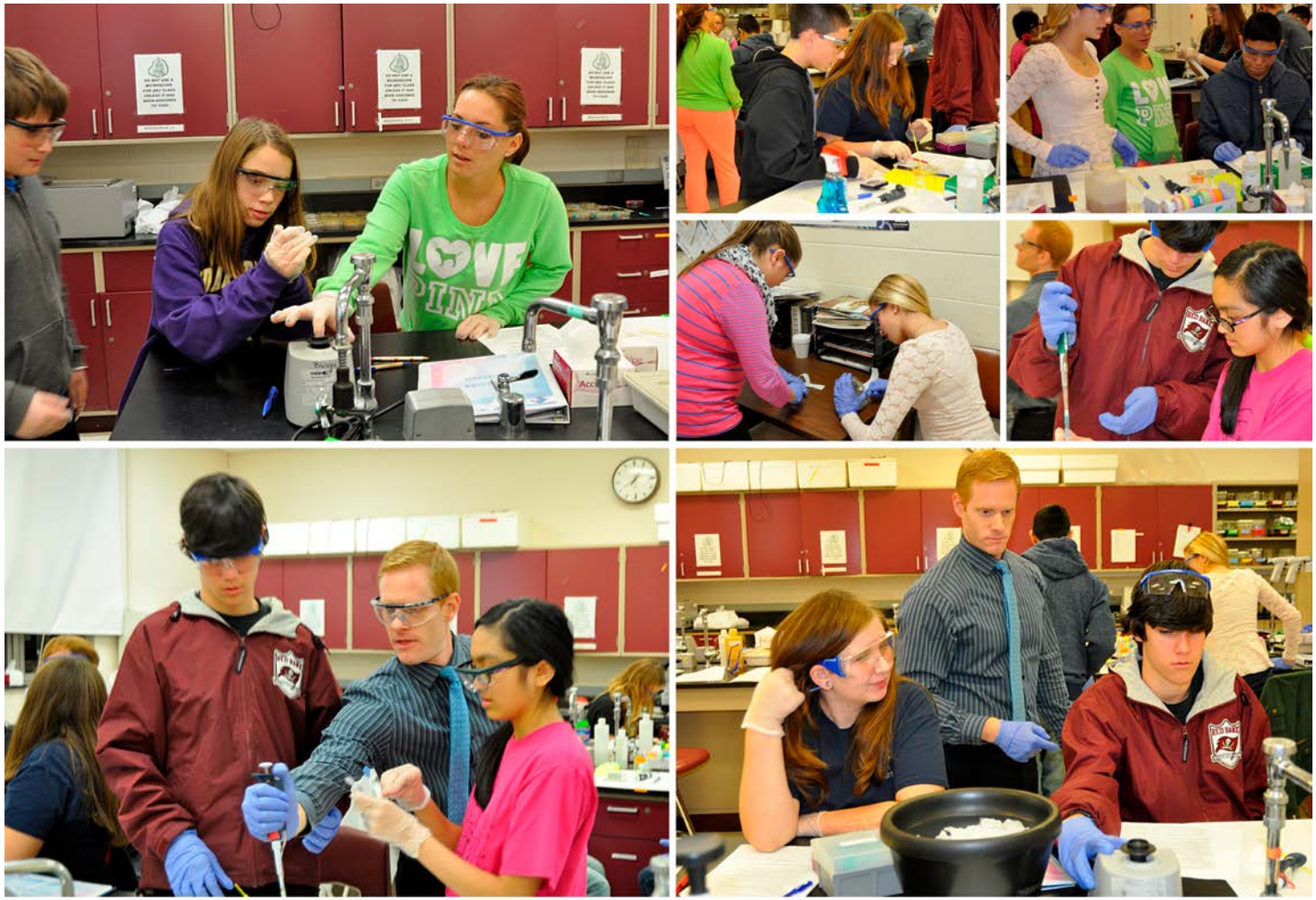
We applied this technique the next week into our study of viruses. After making models of viruses, we compared the DNA fingerprints of 3 viral strains.



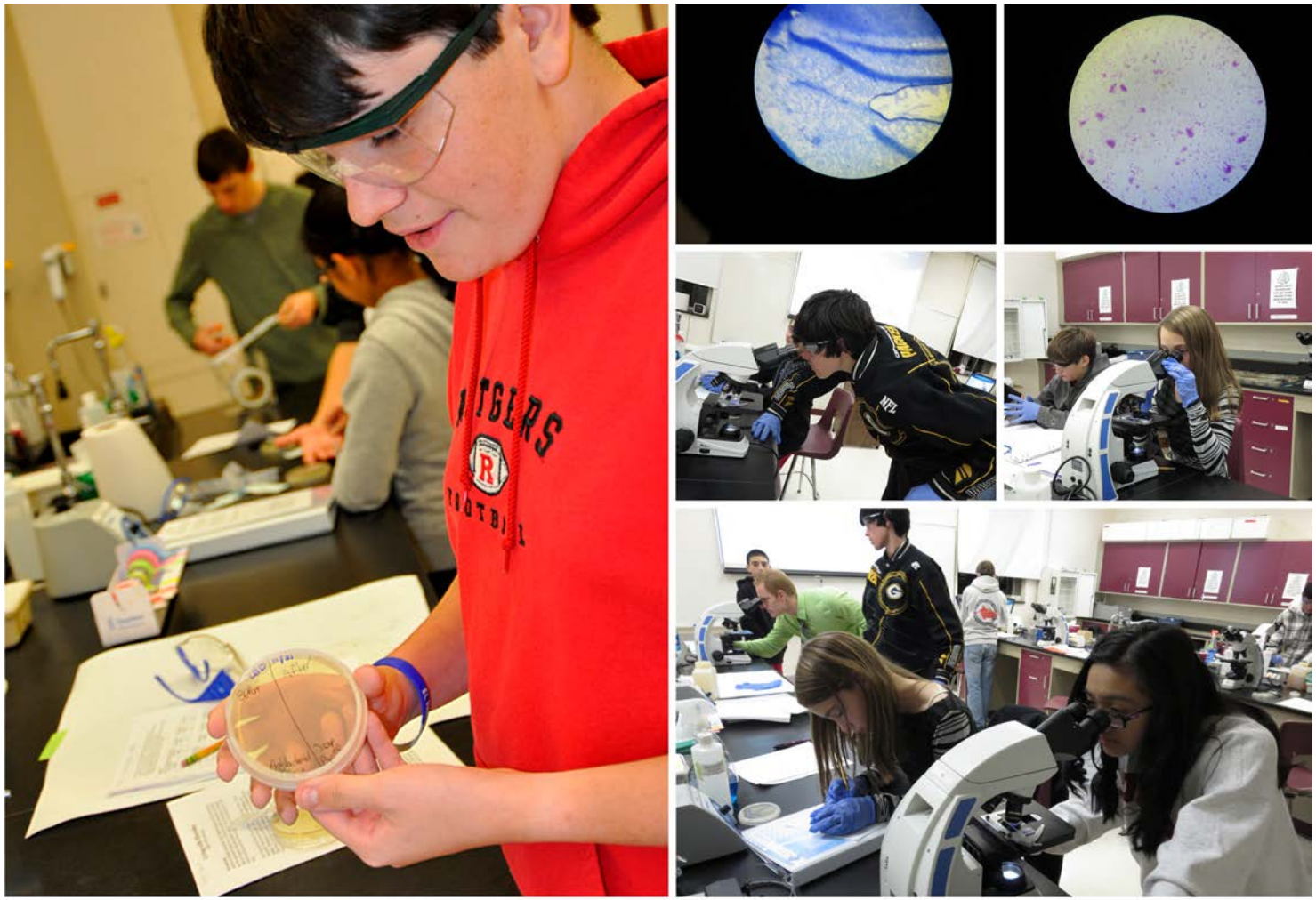

It was fun to use the face hoods while using the UV transilluminator to view our results!



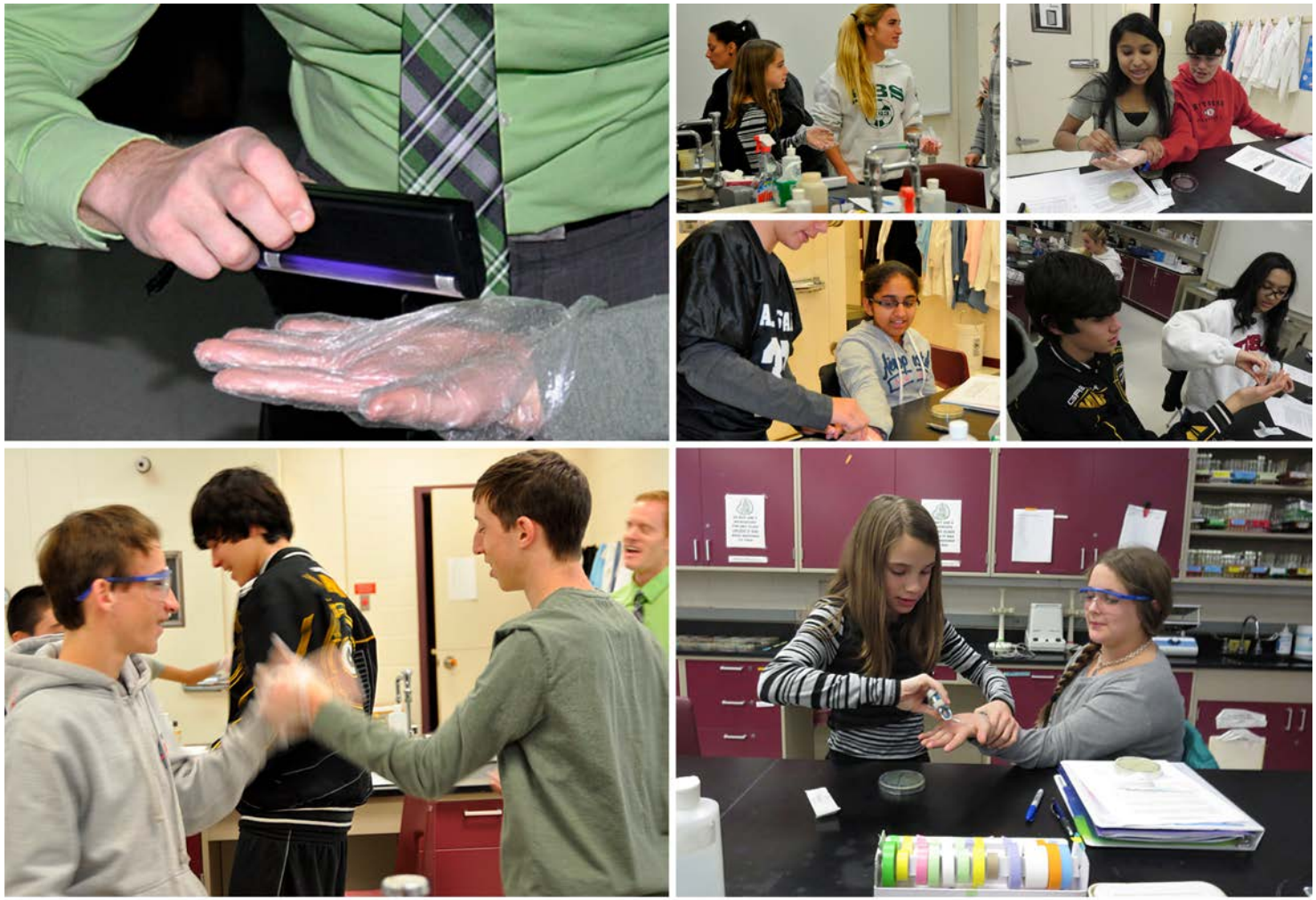
The next stop on this voyage taught us how to genetically engineer bacteria!



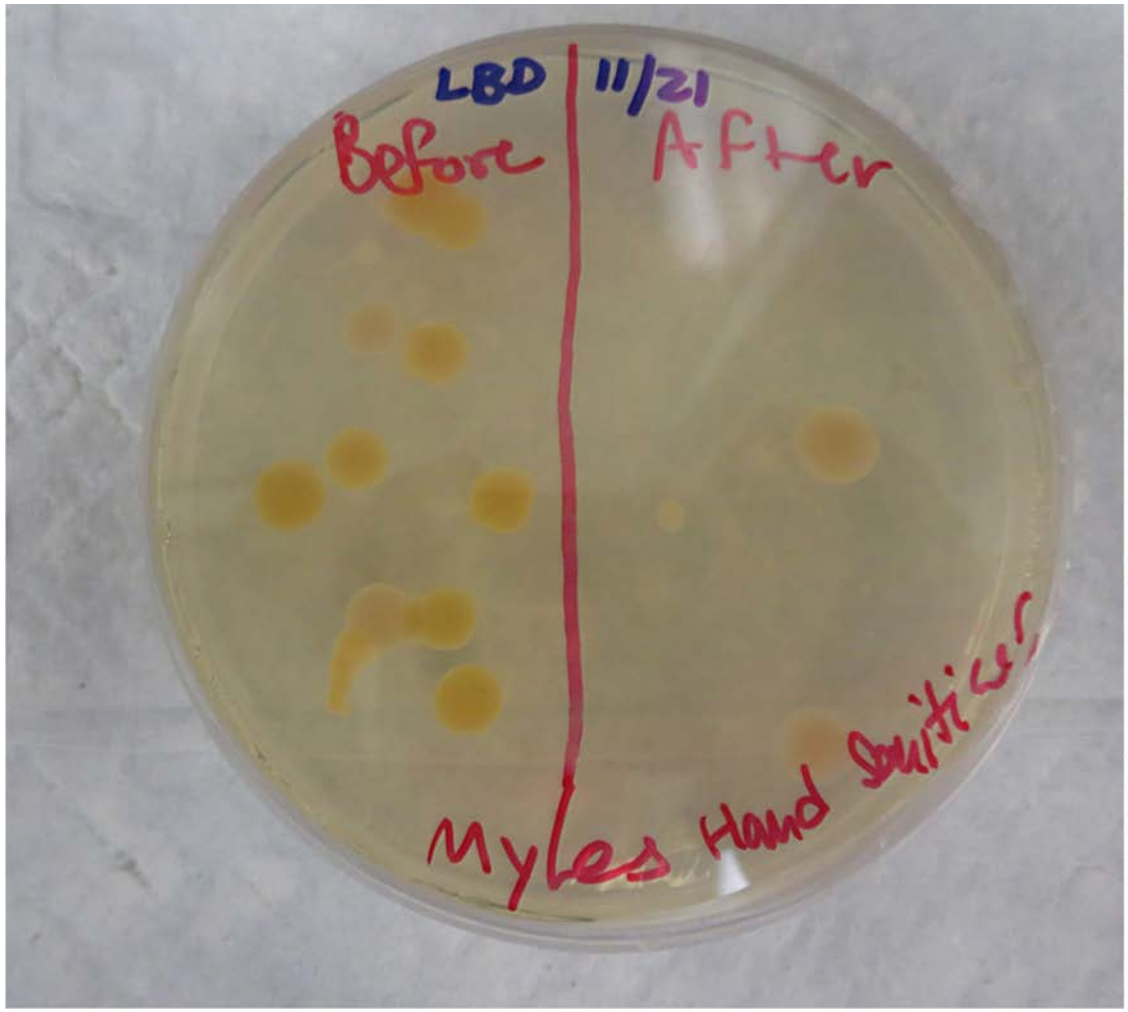
In our transformation experiment, we were able to make E. coli express a green fluorescent protein!



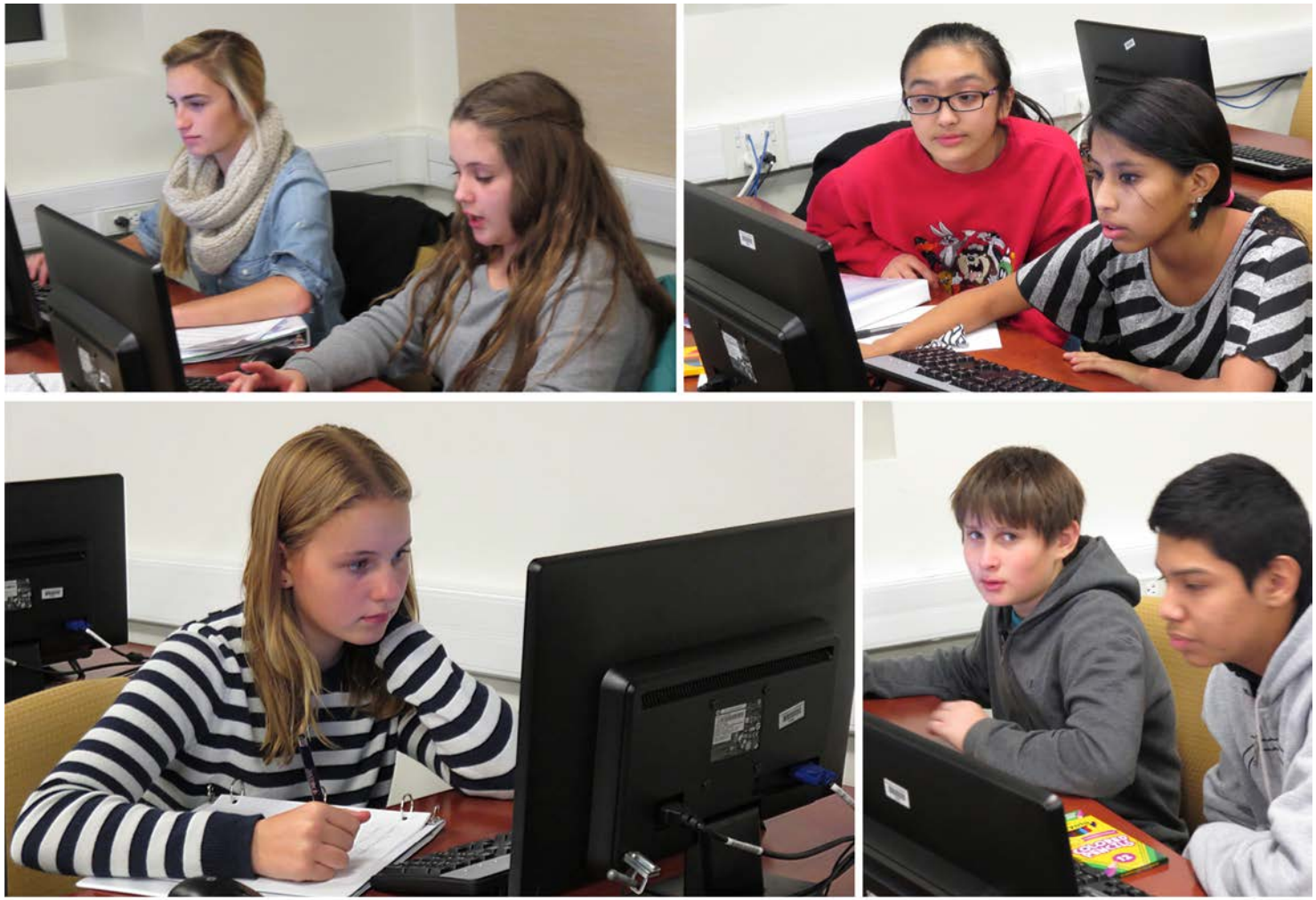
Meanwhile, we did a microbe hunt around Edison Hall to search for microbes. We were able to culture a lot of bacteria from the water fountain!



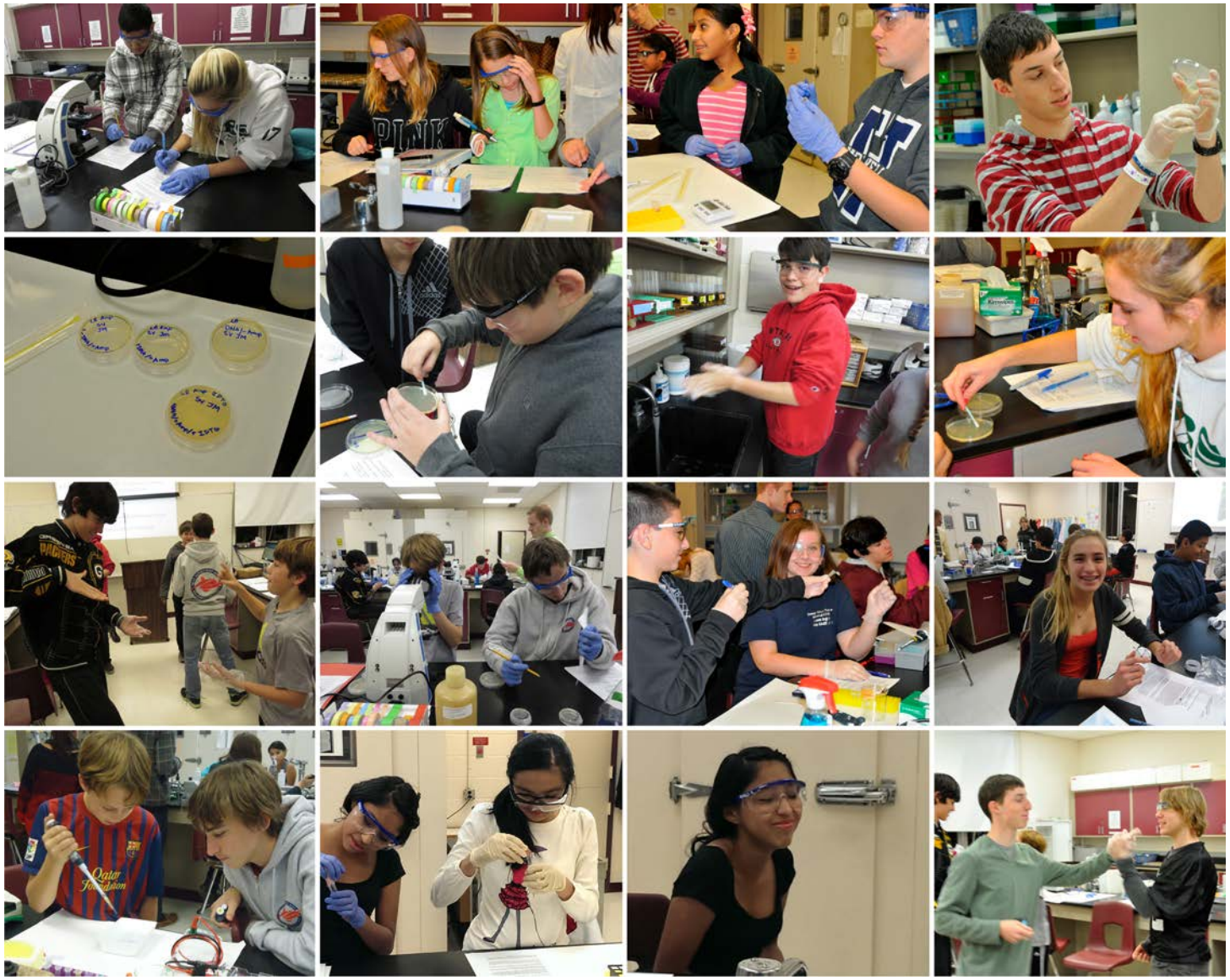
Not all microbes cause disease, but we did explore epidemiology and how diseases spread. This was also a good time to experiment on which method of hand cleaning was better.




Hand sanitizer was unanimously voted as the better method of hand cleaning!



Each group of students was challenged with creating their own genetically modified organism that would help solve a problem.

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