Microbes and the Spread of Sickness at Paxton Keeley Elementary School

Ms. Hegger's and Mrs. Schmidt's 4th Grade Classes

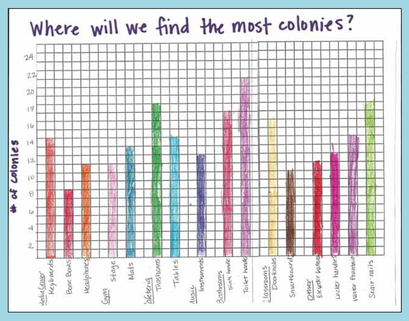
Introduction

The fourth grade students at Paxton Keeley Elementary wanted to learn more about bacteria and viruses and how sickness spreads in the school. We also wanted to learn how to find microbes at different locations in the school, grow them, and then be able to identify them using a microscope. By doing this, we could figure out where in the school has the most bacteria. We also learned about behaviors that make sicknesses spread through a epidemiology survey and then determined how sicknesses may spread at Paxton Keeley using a computer model in order to find ways to prevent the microbes from spreading in the future.

Research Questions and Predictions

Research Question #1: What types of microbes are at Paxton Keeley and where are the most located?

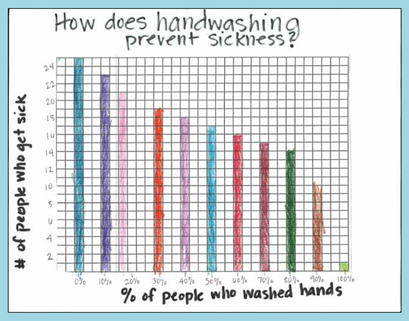
Prediction #1: The most microbes at Paxton Keeley are on the toilet handles because no one washes their hands before flushing.



Prediction #2: The common microbes we find in Paxton Keeley will be good bacteria because they are most common. Viruses are too small to see. We might also find harmful bacteria that can cause pneumonia, pink eye, and diarrhea.

Research Question #2: How do microbes spread in Paxton Keeley and how can we prevent that?

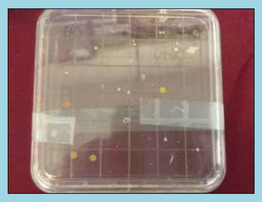
Prediction #1: We believe that microbes can spread mostly by touching, sneezing, and coughing. We think that most of the germs are caused by not washing our hands. If somebody has germs that cause sickness and another person touches an object that the sick person has touched, sneezed, or coughed on, the germs will make the next person sick, too.



Prediction #2: We also predict that soap will be better than Germ-X for killing bacteria.

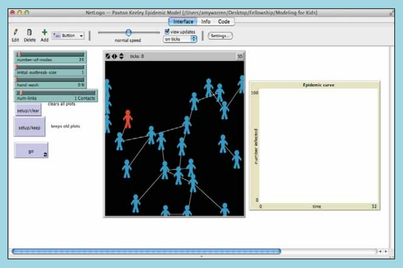
Methods

Research Question #1: To find out where the most microbes were at Paxton Keeley, we first had to prepare the petri dishes. Then we swabbed areas where we predicted would have the most microbes and placed the microbes on the petri dishes and labeled the dishes. We let the microbes grow for a week and then observed the colonies.

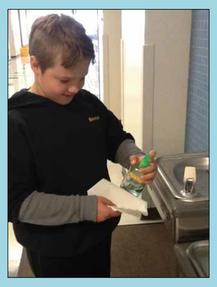


Next, we wanted to determine what microbes were most common at Paxton Keeley. After the teachers went to a lab to Gram stain the microbes, they showed us a video of what they did. We took the slides they had made at the lab and looked at the bacteria under the microscopes. We were able to tell whether the bacteria were Gram positive or negative and describe the shapes—coccus, bacillus, and spiriillum.

Research Question #2: In order to figure out how sickness spreads in Paxton Keeley, we wanted to build a computer model. Models require information to run, so we created an epidemiology survey for all of us to take. Then we used that information to create a computer model that showed how sickness can spread in the school based on how many times we wash our hands and how many people we are close to in a day.

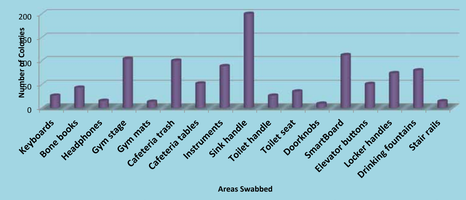


We also wanted to test ways that we can prevent the spread of sicknesses using soap and Germ X. After we swabbed some of the areas in the school, we treated those surfaces with soap and Germ X in order to compare the different number of bacterial colonies that would grow.



Results and Analysis

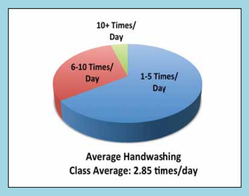
Areas with the Most Microbes



We determined that the most bacterial colonies at Paxton Keeley were found on the **sink handles**, not toilet handles. This makes sense because we touch the sink handles after using the bathroom or touching dirty things.

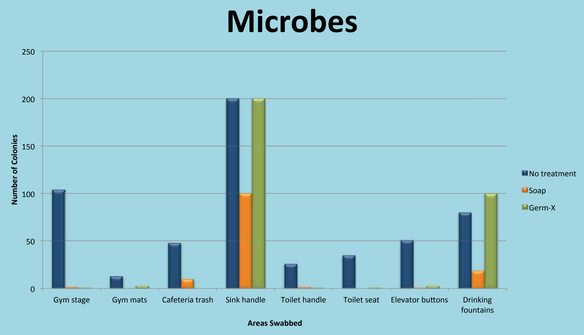
Bacteria Type	#
Gram - coccus	4
Gram + coccus	3
Gram - bacillus	**6**
Gram + bacillus	1
Gram - spiral	3
Gram + spiral	3

The most common type of bacteria we identified under the microscope were Gram – bacillus. This type of bacteria is very common on the human body, so it makes sense we would find them at school.



We found that the average student in our classes washes their hands about 3 times per day. This leads to high risk for the spread of sickness. Using our computer model, we saw that washing our hands 10+ times per day would stop a sickness from spreading in our classrooms and that no hand washing causes a long epidemic where everyone gets sick.

How Soap and Germ-X Kill Microbes



We confirmed our prediction that soap kills microbes better than Germ X. Our experiments showed that areas treated with Germ X sometimes had the same amount of bacteria on them as those that were not treated and sometimes there was even more. We suggest washing hands with soap.

Conclusions

We found a lot of microbes in our school, but found out that most of them are harmless. When we are sick, we should wash our hands with soap often to kill the dangerous microbes.

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