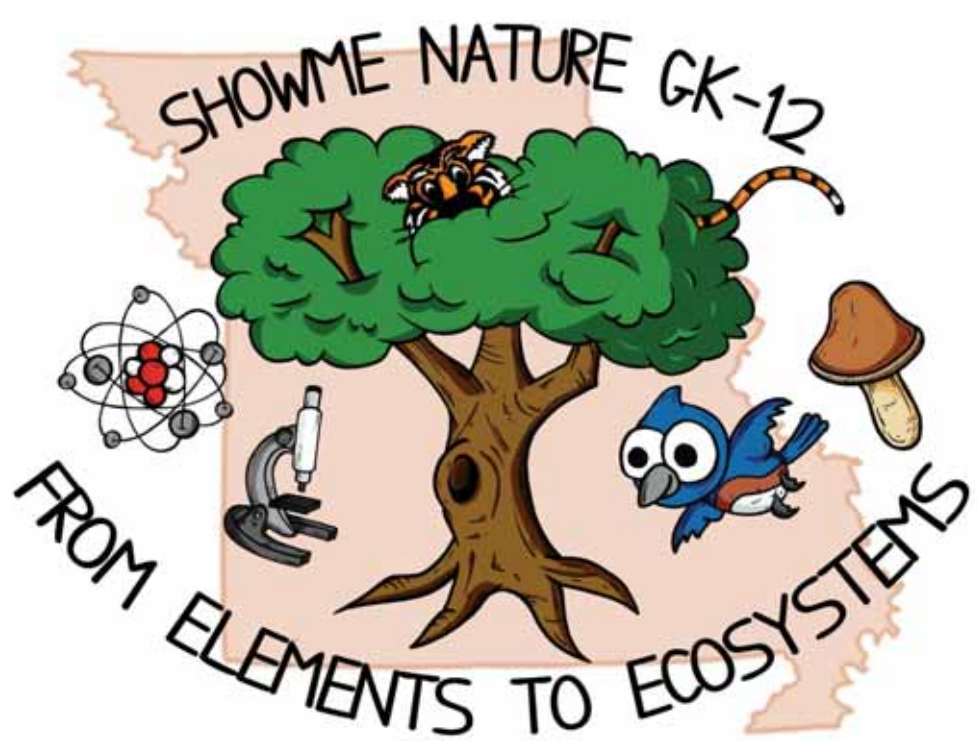
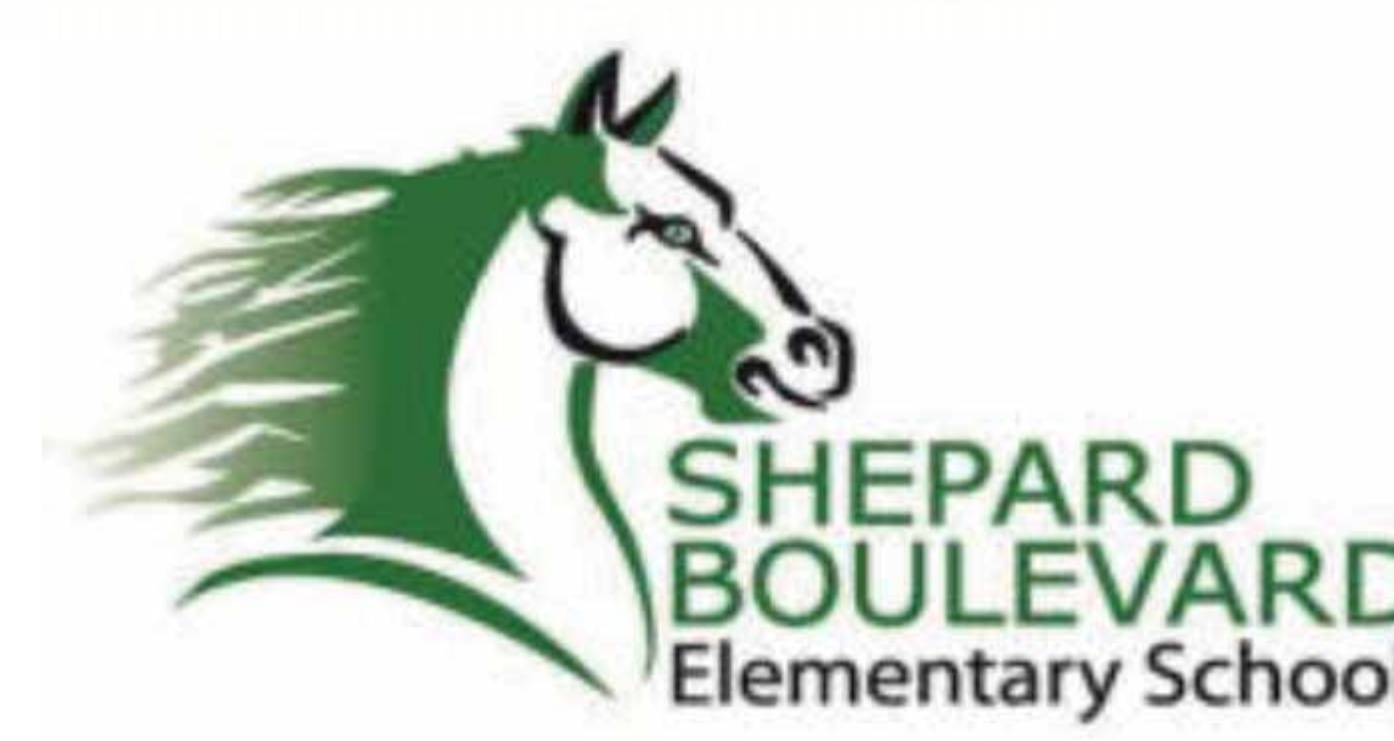


# The Microbial World at Shepard Elementary



Mrs. Aguilar's 5<sup>th</sup> Grade Scientists  
Shepard Boulevard Elementary, Columbia MO



## Introduction

*Microbes are everywhere!* Microbes are little organisms (such as bacteria, fungi, and yeast) that are too small to see with the unaided eye. More than half of the Earth's biomass is bacteria and human beings contain more microbial cells than human cells. While most think all bacteria are bad, less than 5% cause disease. To learn about the microbial world, and find out what is around our environment, we decided to do four experiments at Shepard Elementary and in our classroom.

## Experiments

1. Identify where bacteria grow the most and least around Shepard Elementary and in the classroom.
2. Identify the common types of bacteria we find.
3. Determine the best conditions for bacteria to grow.
4. Determine if anti-bacterial soaps, hand washes, cleaning supplies, and toothpaste actually kill bacteria.

Here we share our findings about microbes at Shepard Elementary. So far we have identified where bacteria grow at our school and have tested if bacteria can survive treatment with cleaning supplies.

## Methods

For all of our experiments we used sterile materials: cotton swabs, agar plates, broth (for dilutions), and saline. We also made an incubator to grow the bacteria from a Styrofoam box, a heating pad, and a thermostat (to record and control the temperature).



### General Protocol for Taking Samples

- Cotton swabs were dipped in saline.
- Area to be sampled was swabbed.
- Agar plates were streaked with swab in a zigzag motion.
- Plates were taped shut and incubated.
- Several detailed observations (drawings and descriptions) were made daily in our science notebooks.

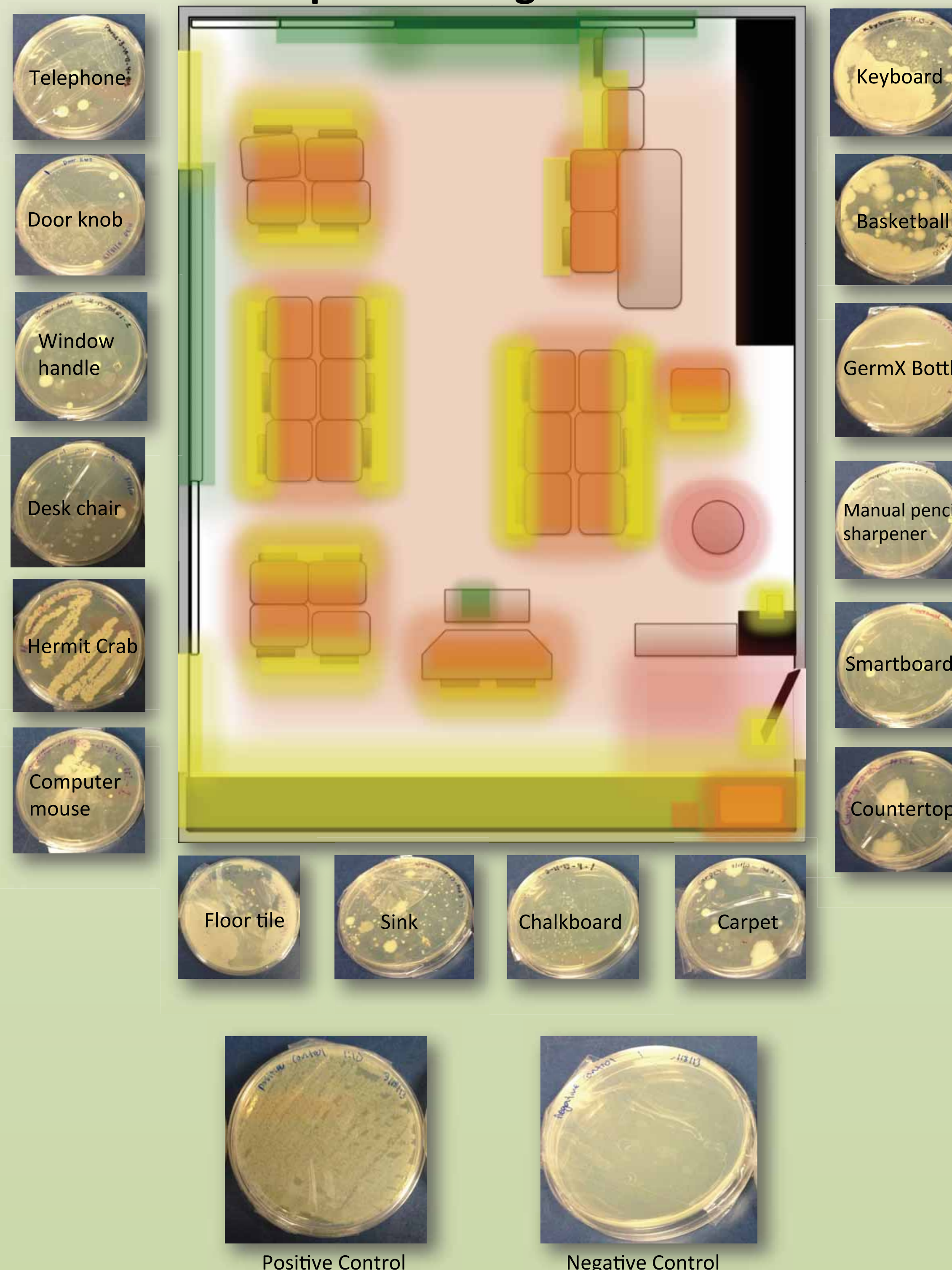


## Results

Classroom Locations	Score	Locations around School	Score
Math book cover	1	Computer lab mouse	1
Smartboard	2	School entrance door	1
Manual pencil sharpener	2	Library desk	2
Chalkboard	2	Computer lab keyboard	2
Telephone	3	Urinal	2
Door knob	3	Cafeteria table (after cleaning)	3
Desk chair	3	Office countertop	3
Window handle	3	Hallway table	3
Countertop	3	Inside door	3
Computer mouse	4	Water fountain (by office)	3
Sink	4	Soap dispenser (by cafeteria)	4
GermX Bottle	4	Girl's bathroom door	4
Computer keyboard	4	Keypad (cafeteria)	4
Desk	4	Hallway floor	4
Carpet	4	Boy's bathroom sink	5
Basketball	5	Gym floor	5
Hermit crab's shell	5		
Floor tile	5		

5 = LOTS of bacteria (lawns and colonies, even on dilutions).  
4 = High amount of bacteria (maybe a lawn, colonies on dilutions).  
3 = Lots of colonies on direct plate (not many on dilutions).  
2 = Not very many colonies.  
1 = Only a few colonies.

## Heat Map of Mrs. Aguilar's Classroom



## Results

We tested four different products for their ability to kill microorganisms on classroom desks. Two types of Lysol brand wipes (a regular disinfecting wipe and a "dual action" wipe), as well as two cleaning sprays that are used throughout Columbia Public Schools (a "light duty" and a "heavy duty" cleaner). Desks were swabbed before and after treatment.



## Discussion

For experiment 1 we expected to see the most bacteria in the bathroom and cafeteria. Inside of the classroom we expected to find the majority of bacteria on places that get used or touched the most. We were surprised to see lots of bacteria grow up as a "biofilm" from the GermX bottle and the shell of the hermit crab. We were surprised to find that the cover of the math book did not grow very many colonies compared to the other locations.

Outside of the classroom we were surprised to find that the computer lab keyboard and mouse did not grow up as many bacteria as the ones inside of the classroom. The door handle for the entrance to the school did not have as many bacteria as we expected. We think that these locations may be cleaned more often.

The cleaning supplies we tested did not work as advertised and did not do a good job of killing bacteria. We found that the dual action wipe worked better than the regular wipe, maybe because it has a side that scrubs. Overall we thought that the sprays worked better than the wipes, which surprised us. Even the best cleaning supply only seemed to reduce growth by about 80%.

In the future we'd like to look into how much bacteria is in other locations, such as outside of the school (the creek and playground) and the dish sponge. We're also planning to finish our experiments to determine the best personal cleaning supplies and conditions for bacteria. We would like to characterize some of the more interesting bacteria we have found.

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