Bacteria on common surfaces

By Caileb D, and Jose R
Period: 5

Problem

Our problem is to figure which common school surface harbors the most amount of bacteria, and how much of a difference can cleaning the surface do.

Abstract

The purpose behind our project was to figure out a commonly asked question. Which common school surface harbors the most bacterial colonies.This information is important to understand because in a school environment it is inevitable for students and staff faculty not to come into contact with these surfaces. Knowing which surfaces have the most bacteria can help us improve the cleanliness in our school, leading to overall less sickness. Our problem for this project was "which common school surface harbors the most baceria?" To figure an answer to this problem we swabbed different common surfaces including the following: door handles, microwave handles, fountain spigot, and a keyboard, we swabbed each of these items twice, once without cleaning and another with cleaning. Each swabbing of put into a petri dishes and checked daily for growth. The testing revealed that the keyboard grew the most bacteria,

showing that commonly touched surfaces without the proper cleaning grow the most amount of bacteria. Although the keyboard grew the most, the others also grew a plentiful amount of bacteria which is a concern for our health. In conclusion after the testing this experiment showed us that the keyboard actually contains the most amount of bacteria. This shows that we should regularly clean these surfaces that we likely think of not needing cleaning to help avoid the spread of germs and sickness.

Project Overview

In this project we will be testing different common school surfaces for bacteria(door handles,microwave handle,drinking fountain,ect). We will be doing this by using petri dishes and swabbing the different surfaces for bacteria. We will swab each different surface three times. One time without cleaning, and a second time with a cleaning product. We are swabbing these surfaces to find one common answer. Where does bacteria live most commonly in a school environment?

Research

In this research project, we explored the question: Which school surface harbors the greatest amount of bacteria? To find an answer, we used various sources such as NSF and National institute of health. A statement made by NSF stated that “there were actually more germs found on an average classroom water fountain spigot than there were on a toilet seat” (“Germiest Places at Schools”). This research conducted by Nsf shows that water fountain spigots contained the highest bacterial levels. Other surfaces which were highly tested had significantly lower colony-forming units (CFUs). For example, faucet handles had approximately 23,000 CFU/in², while keyboards contained around 3,000 CFU/in² (“Germiest Places at Schools”). This shows as a reason for worry. Therefore leading to our own testing. During our search we also used.vybe.care as a source. It states “The human mouth is loaded with bacteria, and studies show that water fountains are places where microbes love to congregate. Water often splashes from a child’s face and mouth onto the faucet or spout as they sip.(Vybe Urgent Care, 2024). This shows that multiple sources show that water fountains often contain the most bacteria.

Hypothesis

If we measure how much bacteria is on common surfaces in a school setting, then we will find that a water fountain spigot has the most bacteria.

Variables

Independent: how much bacteria is on a common surface with and without getting wiped/cleaned

Dependent: We are measuring the amount of bacteria

Controlled: the control variable of our experiment is going to be where the petri dishes are placed, the amount of swabbing we do, and room temperature

Materials:

Cotton swabs, petri dish, alcohol wipes

Procedures

Our procedures in order: 1. we find the common surfaces we will measure 2. we open our petri dishes in preparation for swabbing 3. We swab each surface without cleaning the first 4. we get another petri dish and swab that

same surface but cleaning with just water 5. Lastly we get one last petri dish and swab that same spot after cleaning with a disinfectant wipe 6. We close the petri dishes and get them ready to put away 7. We store away the petri dishes in a controlled environment to ensure full fairness and accuracy for bacteria growth 8. We check on them once daily and measure and take note of any change that has occurred.

Data/Observations
Table(s)

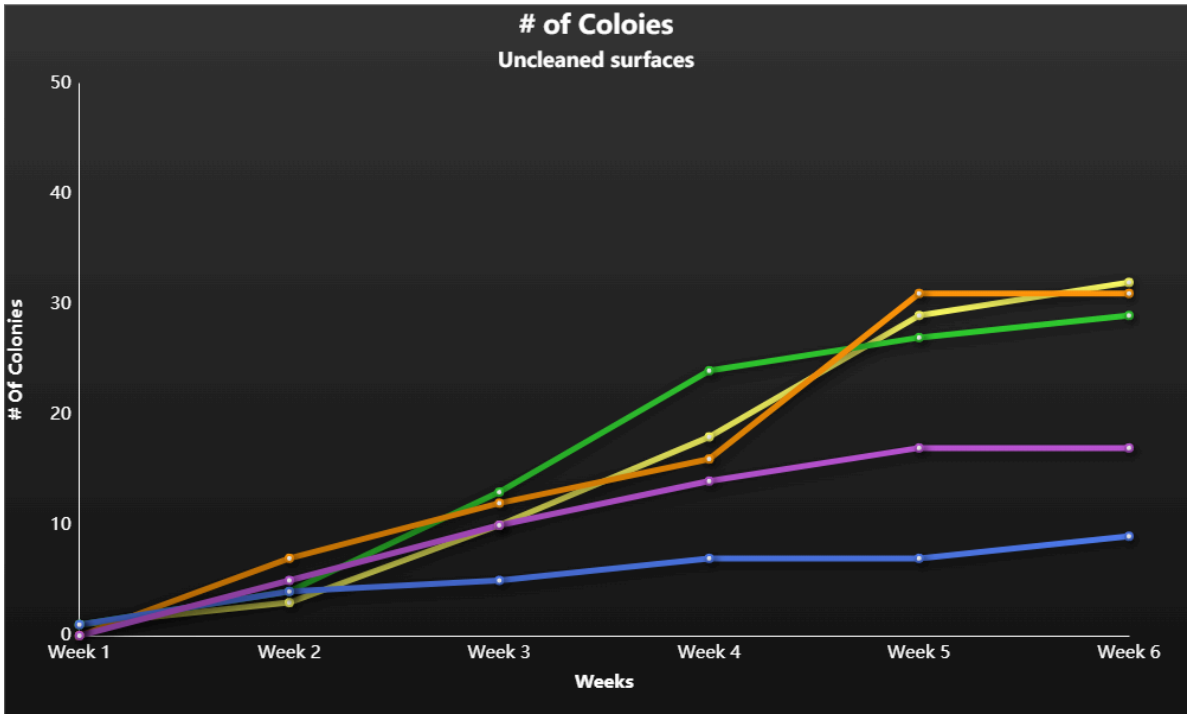
# of Colonies on Uncleaned Surfaces

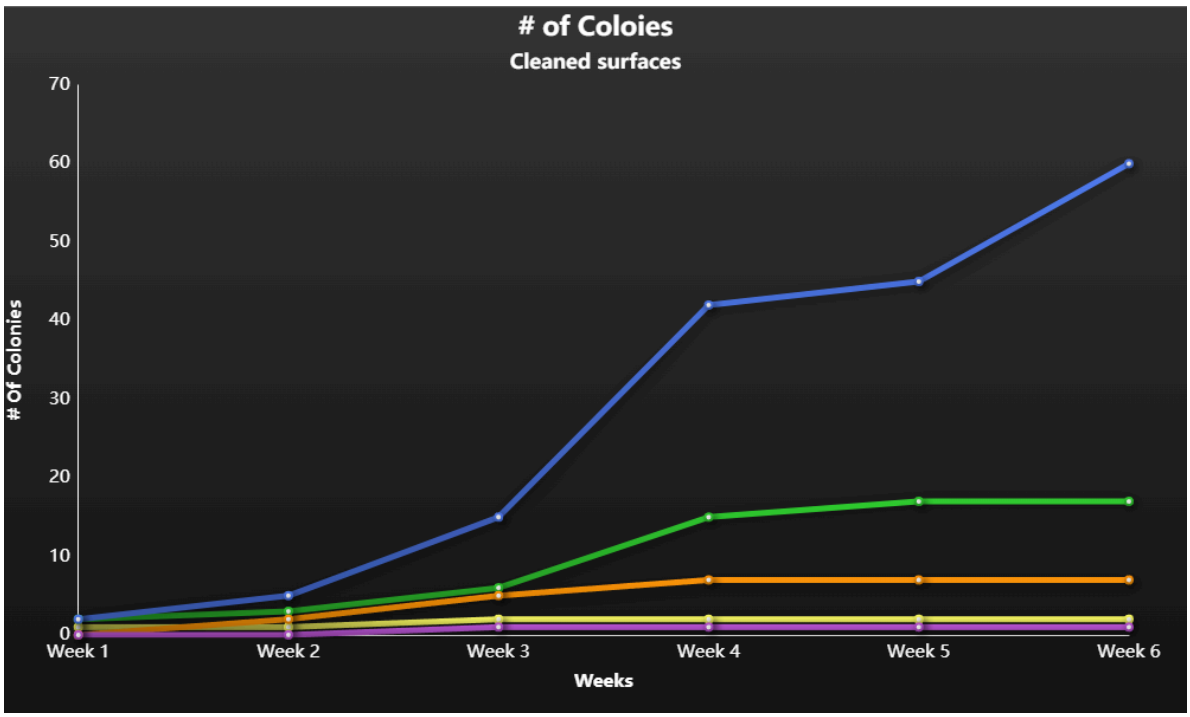
week	Microwave	Keyboard	Restroom door handle	Spigot	Urinal	
1	1	1	0	1	0	
2	3	4	7	4	5	
3	10	13	12	5	10	
4	18	24	16	7	14	
5	29	27	31	7	17	
6	32	29	31	9	17	

# of Colonies on Cleaned Surfaces

week	Microwave	Keyboard	Restroom door handle	Spigot	Urinal	
1	1	2	0	2	0	
2	1	3	2	5	0	
3	2	6	5	15	1	
4	2	15	7	42	1	
5	2	17	7	45	1	
6	2	17	7	60	1	

Graph(


# of Coloies
Uncleaned surfaces
50
40
30
20
10
0
Of Colonies
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Weeks



Group	Group	Group	Group	Group
Microwave Handle	Keyboard	Restroom Door Handle	Spigot	Urinal Flush Handle
Colour	Colour	Colour	Colour	Colour
Yellow	Green	Orange	Blue	Purple

Results

For the first trial (surfaces without being cleaned), the data shows that there is a significant amount of bacteria growth on each surface. For the second trial (surfaces after being cleaned), the data shows a significant amount less bacteria (except for one case) on each surface, on average after 6 weeks of growth the second trial (excluding the spigot) showed a 76.66% decrease in the number of colonies. Our data showed that we were partially correct about our hypothesis, the data shows that before cleaning the surface the number of colonies of the spigot is the lowest, while after cleaning the surface the spigot showed the most amount of colonies.

Conclusion

The results of the experiment were satisfying, and our hypothesis was somewhat correct. Our hypothesis states that the water spigot will harbor the most amount of bacteria. When we swabbed for bacteria without cleaning, we made a mistake, which caused the data to be altered, but when we swabbed after cleaning, the data shows that it harbors more colonies of bacteria than any other.

Recommendations

If we were to do our project again, I would change a few things, like the amount of surfaces swabbed, and possibly adding more variables. I think that we could have found out a way to measure the actual number of bacteria, other than the number of colonies. We made one mistake during the experiment, when we didn't dry off the spigot, and it could have possibly messed with our data. We could have avoided this, if we had just made sure the surface was dry.

Bibliography

Clark, Phil. “Germ Hotspots in Schools: 10 Places You Never Thought to Clean | Vanguard Cleaning Systems of the Ozarks.” *Vanguard Cleaning Systems of the Ozarks*, 18 Feb. 2025, www.vanguardozarks.com/2025/02/germ-hotspots-in-schools-10-places-you-never-thought-to-clean.

“Germiest Places at Schools.” *https://www.nsf.org/consumer-resources/articles/germiest-places-schools*, 2005, www.nsf.org/consumer-resources/articles/germiest-places-schools. Accessed 24 Nov. 2025.

Mdg. “5 Germiest Places in Schools: Why Is My Kid Always Sick?” *Vybe Urgent Care*, 16 Sept. 2024, www.vybe.care/blog/5-germiest-places-in-schools-why-is-my-kid-always-sick.

“New Study Reveals Germiest Hot Spots at School.” *North American Precis Syndicate, Inc.*, 13 May 2021, mynewstouse.com/stories/new-study-reveals-germiest-hot-spots-at-school,17018?