100/100 SAMPLE LAB REPORT

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Lab Report

Question: Do different types of hall passes harbor different types of bacteria?

Title: Different types of bacteria found on hall passes of different materials in Moscow High School.

Abstract: This lab was conducted to find if different types of hall passes harbor different types of bacteria. Prior research showed that *Staphylococcus aureus, Aerobic* bacteria, yeast, and mold have been found in schools. We hypothesized that hall passes made of different materials from each other would harbor different bacteria from each other. To carry out this lab we swabbed distilled water and three hall passes with cotton swabs and smeared those swab samples onto an agar plate. We then sealed the agar plate and placed it under a lamp for the bacteria to grow. The sample from the rubber chicken hall pass grew a few types of bacteria while the tin and duct tape hall passes grew the same as each other and the same as the control. These results did not support our hypothesis.

Introduction: The purpose of our lab was to find if different hall passes made of different materials grew different types of bacteria. We researched studies that others had conducted on this topic. No prior studies were found that focused specifically on materials of hall passes, or even on hall passes. One study found *Staphylococcus aureus, Aerobic* bacteria, yeast, and mold in various locations around a school. All of these types of bacteria can potentially cause diseases. Mold and yeast were found most around restrooms, mold was found around entry ways and *Staphylococcus aureus* and *Aerobic* bacteria were found in other locations often visited by students. (Wang, 2006) Another study found *Staphylococci, Streptococci, E-coli, Salmonella,* and *Campylobacter* in restrooms and locker rooms on a college campus. (Jones, 2008) Finally, a

recent newspaper article stated that copper, silver, and bronze are historically known to fight bacteria. (McKee 2013) Again, these did not have anything to do with the main object of our study, hall passes, but they did show what types of bacteria could be picked up on hall passes when students take them to the bathrooms and other areas of schools. Many hall passes in Moscow High School look very unclean, and sometimes this causes students to avoid using the restroom or getting a drink when they need to. A hope with our experiment was to find which hall passes are cleanest and possibly try to convert all the passes to be made of the cleanest material. The hall passes we tested were a rubber chicken, a plastic rod covered in duct tape and with a duct tape handle, and a tin lid. This experiment was important because it could potentially help prevent the rapid spread of illnesses through the school by finding the most effective material for hall passes.

Hypothesis: If different bacteria are harbored on different hall passes, and if we grow samples of bacteria from three different hall passes on an agar plate, then different kinds of bacteria will grow from each hall pass and from the distilled water.

Materials:

- 1 agar plate
- 1 permanent marker
- 1 100 mL beaker
- 20 mL of distilled water
- 4 cotton swabs
- 3 hall passes to sample
- 1 timer
- 1 10 centimeter strip of laboratory film

- 1 incubator or somewhere warm for bacteria to grow

Procedure:

1. Prepare an agar plate with beef broth agar
2. Label the bottom (not the lid) of the agar plate with a permanent marker, splitting it into four sections by drawing two straight, perpendicular lines and labeling three of the sections with names for hall passes and one with "control"
3. Poor about 20 mL of distilled water into a beaker
4. Get four cotton swabs
5. Dip one end of one cotton swab into the distilled water and smear it on the section of the agar labeled "control" in an S-shape leaving enough space for another smear like it
6. Repeat step five with the other end of the same cotton swab
7. Bring agar dish, beaker of water, and cotton swabs with you to your first hall pass
8. Dip one end of another cotton swab into the distilled water
9. Swab your first hall pass with this watered end of the cotton swab for 5 seconds
10. Smear this end of the cotton swab on the section of the agar corresponding to this hall pass in an S-shape leaving space for another smear like it
11. Repeat steps 8-10 with other end of the same cotton swab
12. Proceed to your next hall pass and repeat steps 7-11
13. Repeat step 12
14. Return to your lab and seal your agar plate with laboratory film
15. Label your agar plate with the name of someone in your group
16. Place agar plate lid-down in incubator

Graph: For results, see *Figure 1*

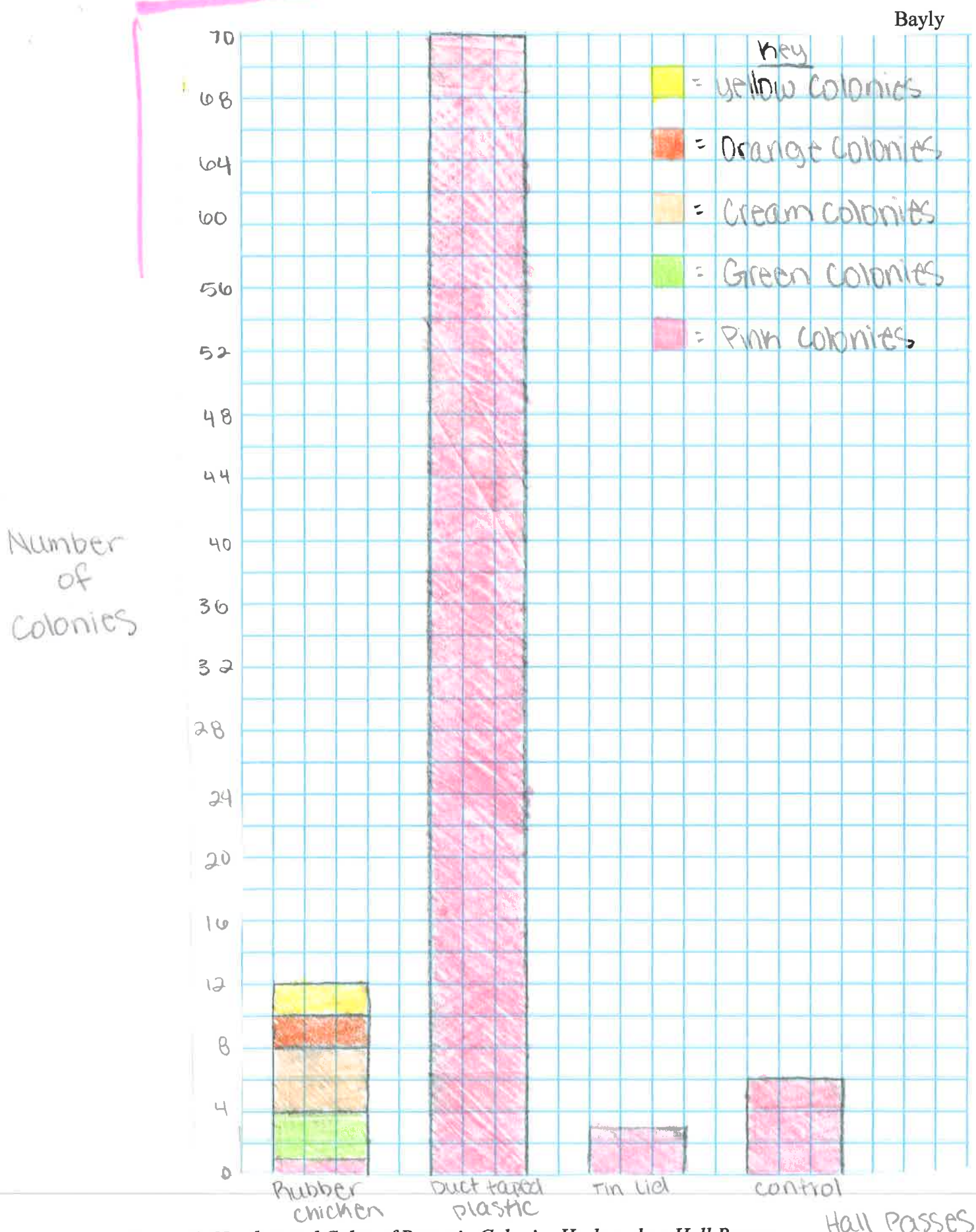

Figure 1: Number and Color of Bacteria Colonies Harbored on Hall Passes

Analysis and Discussion: The rubber hall pass grew two orange colored bacterial colonies, two yellow colored colonies, one pink colored colony, three green colored colonies, and four cream colored colonies; the duct tape hall pass grew 70 pink colonies; the tin hall pass grew three pink colonies; and the control grew six pink colonies. The duct tape hall pass harbored the most colonies and the rubber hall pass harbored the most different types of colonies. Also, the tin hall pass harbored fewer bacteria than distilled water. Finally, our results showed that both duct tape and tin harbor the same type of bacteria while rubber harbors many different kinds. These results do reflect our question; we saw growth of bacteria from each sample and are now able to evaluate our hypothesis. It would have improved the experiment to have grown samples from more hall passes. The fact that the sample from the tin hall pass grew fewer bacteria than the control and of the same color suggests to me that there may have been an error in collecting this sample. When swabbing we may have smeared the wrong side of the cotton swab onto the agar, or perhaps did not swab for as long on this sample. Another possible factor is that the tin hall pass had been sanitized shortly before our sample was taken from it. Thirdly, perhaps these were sound results and tin fights bacteria very well along with copper, silver, and bronze, as found in prior research, or perhaps the lid is not entirely tin, but has one of these other bacteria fighting metals in it. These results do not support our hypothesis. We thought that we would find different types of bacteria on each hall pass and that the bacteria on the hall passes would be different from the bacteria in the distilled water. This was only the case from the rubber hall pass. The duct tape and tin hall passes grew the same bacteria as the distilled water and the same as each other. If I were to repeat this experiment I would take samples from more hall passes and pay more attention to detail in the amount of time each hall pass was swabbed for. I would also be sure that the sample was transferred to the agar properly; with the same side of the cotton swab

that touched the hall pass being smeared on the agar. In addition, I would like to let the samples grow for longer and at a warmer temperature. I would like to let them grow for longer because the duct tape hall pass had zero visible colonies after five days of growth and 70 visible colonies on the sixth day, and perhaps the tin hall pass would have had a similar outburst if it had been left to grow for a few more days.

New Hypothesis: If greater or fewer bacteria are harbored on different surfaces in school restrooms, and if samples are taken from school restrooms' door handles, sink knobs, and paper towel dispenser levers, and grown in agar, then the most bacteria will grow from samples taken from restroom door handles.

Conclusion: My data did not support my hypothesis. Two of the three samples grew the same type of bacteria as each other and as the control.

Works Cited:

Wang, Z. (2006). *Potential pathogens in the school environment*. Retrieved from http://www2.uwstout.edu/content/rs/2007/Pathogens.pdf

Jones, C., Diewald, J., Georgeadis, P., & Cisar, M. (2008).*Bathroom bacteria*. Retrieved from http://jrscience.wcp.muohio.edu/nsfall02/FinalArticles/Final6HereistheFINALfinal.html

McKee, B. (2013, December 14). *Pullman regional hospital fights infection with metal*. Retrieved from http://dnews.com/local/article_3d5d767b-e0ff-5c42-8bfe-9795ed8dd71c.html

Appendix 1: Data Table

Table 1: Results of experiment for hall passes and control

Sample	Number of colonies	Number of colonies by color
Rubber Chicken	12	1 pink, 2 orange, 2 yellow, 3 green, 4 cream
Tin Lid	3	3 pink
Duct Taped Plastic	70	70 pink
Control	6	6 pink