

Bacteria Are Everywhere! Where Are My Bacteria?

Directions:

How effective is hand washing or using anti-bacterial gel in removing bacteria? Let's find out.

Samples of bacteria will be collected from the palm of your hand and bacteria will grow over time. To reduce experimental error, samples should be taken from only one student, but under three different conditions:

1. Unwashed hands
2. Hands washed with soap and water
3. Hands washed with anti-bacterial soap
4. Use this worksheet to collect and organize your information. Make sure not to lose it, as this experiment will be done throughout one week.

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Part 1. Scratching the dishes

- 1) Choose a student from each group for each of the following roles: The Boy/Samplee (whose hands will be sampled), the Swabber (who will take the samples), the Supervisor (who ensures that the correct Petri dish is being used), and the Cleaner (who washes and sterilizes the equipment). Note: it is very important that the samples come from the same person to reduce experimental error.
- 2) Your teacher will give you three Petri dishes that are previously labelled; please identify each of the dishes.
- 3) Start with the dish labelled "Unwashed." The swabber should get a sample by gently rubbing a cotton swab on the surface of the Samplee student's palm. Do not leave the cotton swab on the table.
- 4) The supervisor should open the Petri dish labelled "Unwashed," containing the agar.
- 5) The swabber should gently rub the sample of the cotton swab taken from the student's unwashed hand, on the agar. Be careful not to apply too much pressure when doing this, otherwise the agar could tear.

- 6) The supervisor should close the Petri dish.
- 7) The fourth member of the group, the cleaner, should carefully wash one of the Samplee's hands with soap and water.
- 8) The swabber and the supervisor should repeat steps 4-6 for this hand, making sure to use the dish labelled as "Washed."
- 9) Finally, the cleaner should apply antibacterial gel to the other hand of the samplee student (the hand that has not been washed in the previous steps). Let the hand air dry until the gel has evaporated.

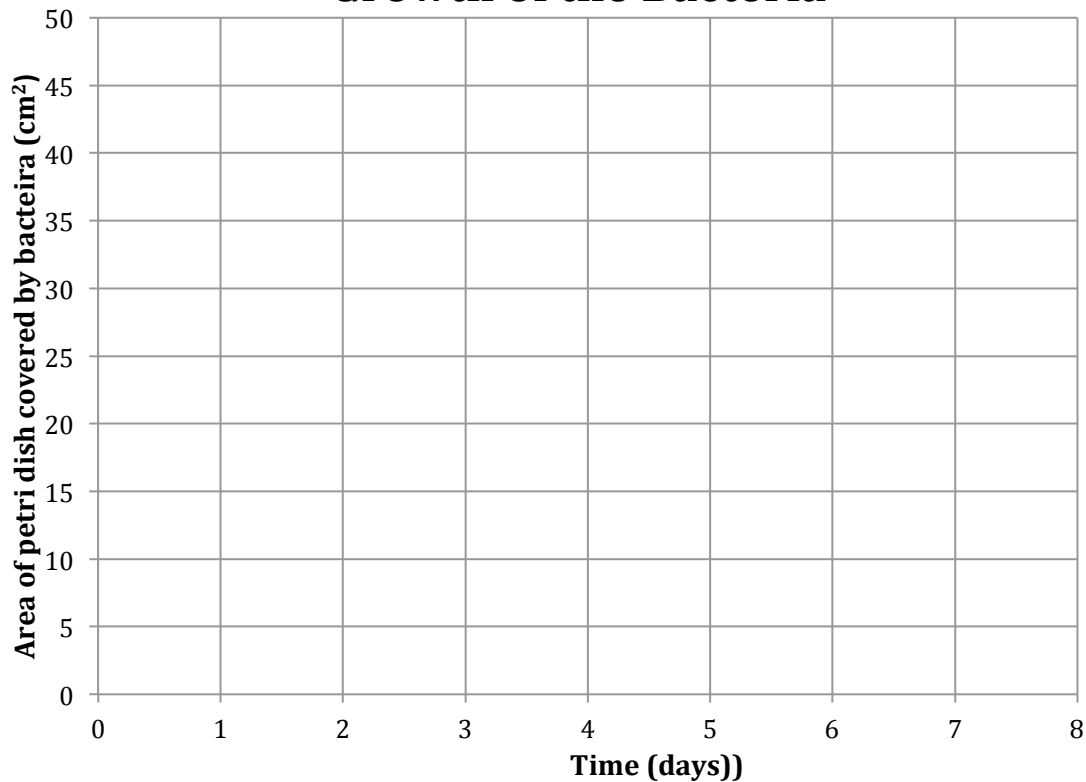
Part II: Data Acquisition

Fill in the table after analyzing the images of your Petri dishes with the area covered by bacteria (in centimeters squared). Record any comment or observation of the sample.

Sample	Area covered by bacteria (cm ²)			Comments & observations
	Day 2	Day 4	Day 6	
Unwashed hand				
Washed hand				
Disinfected hand				

Mark the area covered by bacteria of the three samples vs. the time (in days) on the graph below. Make one line per sample, and choose a different color for each line. Label each line with the name of the sample it corresponds to.

Growth of the Bacteria



Part III: Reflection

Answer the following questions to summarize the results of the experiments.

- 1) Which sample had the most bacterial growth? Was this the result you expected?
- 2) Did any bacteria grow on the hand that was used with antibacterial gel? If so, do you agree with the slogan used by many brands that states that it "kills 99% of bacteria?"
- 3) What do you think would happen if you were to scratch the plates with bacterial samples from other common surfaces, such as the door handle, kitchen tables, or the handrails in a subway station? Discuss what you would expect based on your results.