Bacteria Lab [List the names of your lab group]

**Hypothesis**
-[Make an educated guess about which has more bacteria, and explain why you think so]
-**If** bacteria is collected from [Location 1] and [Location 2], and grown in a petri dish, **then**there will be more bacterial colonies on the side from [Location ?]

**Materials**
2 Petri dishes with agar
4 Cotton swabs (Q-tips)
Permanent marker
Tape

Hand sanitizer

Incubator

**Pre-lab procedures**
1) Complete the diagram above showing how you will label your petri dishes (period, group name, and what goes in each section)

Key:
O = Petri dish control = do nothing
X = Cotton swab control = fresh cotton swab
1 = Sample 1 = [Location 1]
2 = Sample 2 = [Location 2]

2) On your petri dish diagram, also draw how you will streak the bacteria onto the agar

3) Write an **extremely detailed description of Location 1 so that anyone else could find it without your help**

4) Draw a diagram of Location 1 and indicate where you will collect the bacteria

5) Repeat steps 3 and 4 for Location 2

6) Check with Mr. Warren before continuing

**Helpful tips:**

* Minimize the amount of time the petri dish stays open so bacteria from the air doesn’t get in
* Minimize the amount of time your cotton swabs are out in the air, too.
* Do not touch, talk over, or breathe over the heads of the cotton swabs
* When streaking onto the agar, do so gently to avoid puncturing it.
* Be as consistent as possible in the way you collect and streak bacteria to make sure your results can be compared fairly.

**Procedures**:

7) Neatly label the bottom (not the lid) of your 2 petri dishes

8) Use hand sanitizer and obtain 3 cotton swabs

9) Take your petri dishes and cotton swabs to location 1

10) Collect bacteria with 1 cotton swab, immediately streak it onto the agar, and replace the lid. Using the other end of the same cotton swab, collect your second sample from right next to the same location, and streak it on the agar in the second petri dish.

11) Take a picture of the location such that it is easy to tell where the bacteria came from (optional, but recommended)

12) Repeat steps 9 through 11 for location 2

13) Repeat step 10 for the cotton swab control (X), except don’t collect any bacteria first.

14) Return to class and throw out the used cotton swabs

15) Tape the petri dishes all the way around the sides
16) Store the petri dishes upside-down for 1-2 days at body temperature (37°C) or 2-3 days at room temperature (24 °C)

17) To stop any further bacterial growth, store the petri dishes in the refrigerator (4°C) until ready to view.

18) Count, measure, describe (sizes/shapes/colors), and draw (or take a picture of) the bacterial colonies that grew.

**\*Do not open the petri dishes\***

*(Write this before starting the lab)*

**How to interpret your results:**

-Each beige spec is one “bacterial colony”, which came from a single bacterium, which divided exponentially until there were enough piled up to see with the naked eye. All of them in the pile are genetically identical to each other (ignoring any mutations during replication).

-Different sizes/colors of individual bacterial colonies (or fungi) indicate different kinds all found in the same location.

-If there are too many bacteria too close together, they may clump up, making it impossible to count individual colonies.

**Lab Report** (everyone writes their own)

**Background Information**

-What 2 locations are being compared, and why you want to compare them.

-State the independent variable (the conditions you’re trying to compare) and the dependent variable (the result you measure, which depends on the conditions you chose).

-Include your hypothesis.

*(Write this after puting the petri dishes in the incubator)*

**Methodology**

-Written as a narrative (complete sentences/paragraph form) in 3rd person, passive voice, and past tense.

-Include what each item in the materials list was used for as you write what was done in the experiment.

-Include the reasons for having not only sections of the petri dish for the two locations but also a section that has nothing on it and a section for the un-used cotton swab.

-Include any deviations from the procedures, mistakes, etc., and don’t include any procedures your group didn’t actually follow.

-Insert diagrams/pictures of the 2 locations, and label them.

*(Write this after your petri dishes are returned to you)*

-Indicate how long the bacteria was left in the incubator / refrigerator

-Describe how you collected the data (step 18 in the procedures)

**Data Analysis**

-Provide all of the qualitative (descriptions) and quantitative (numbers) data you can about the bacteria that grew

-Include the results from the control sections, even if there’s nothing growing in them.

-Explain why you think you got the results you did (if there are other possible explanations, include those too!)

-Insert drawings or pictures of the petri dishes.

**Conclusion**

-Explain what you thought about the lab, what you thought about the results, etc.

-Write about at least 1 of the following:

-Make a recommendation to someone based on your results.

-Explain what could have been done better, and how.

-Explain what you would want to test next and why.