

**Name: Christie**

## **Discovering the Conditions That Promote the Growth of Bacteria**

**The purpose of this activity is to investigate various microhabitats to determine which characteristics of these microhabitats most effectively promote the growth of bacteria.**

**Which places have the most bacteria?**

### **l) Background Information:**

**Even though we can't see them, microbes are present wherever the proper conditions exist to sustain life. They live in and on humans and other animals, as well as on plants. They also live in the water, soil, and air. In this investigation, you will scavenge for bacteria in various microhabitats.**

**Bacteria are simple and small; they are single-celled prokaryotes, typically only 1 micrometer in diameter. They are among the most numerous life forms on the planet. Bacteria can be found everywhere other life exists and even many places too extreme for larger organisms.**

**Bacteria are so small that they cannot be seen without the aid of a microscope, so people didn't know they existed at all before 1676 when Anton van Leeuwenhoek used his handcrafted microscopes and keen eye to observe the bacteria living in a droplet of water,**

**Van Leeuwenhoek sought out bacteria and other microbes in many environments. He collected standing water from ponds and roadside ditches. He made infusions of peppercorns, hay, and beans. He also scraped the plaque from between his teeth. Each time he looked at something new he described his observations in his diary. To convince other people that he wasn't imagining his "wee beasties," he hired an artist to look through his microscopes and draw what he saw there.**

**When Van Leeuwenhoek first looked at neither bacterium he had no idea how common they are or how important they are to life on this planet. It took the research of many microbiologists who followed van Leeuwenhoek to explain the intricate relationships that exist between bacteria and larger organisms. Some bacteria cause disease, while other bacteria in our bodies are essential to our health. Bacteria in the soil decompose organic material (leaves, dead animals, etc.), turning it into usable food for plants. Bacteria are also crucial to modern biological research and biotechnology.**

**Bacteria can be cultured, or grown, on nutrient agar. Nutrient agar is a jellylike substance extracted from seaweed to which nutrients have been added so that bacteria or other microorganisms' can be grown on it. If conditions are favorable, bacteria will rapidly reproduce by dividing in two. Eventually, bacterial reproduction produces spots on the nutrient agar, each of which consists of the many descendants of a single bacterium. These spots, which are visible to the unaided eye, are called colonies.**

**Bacteria grows best when there is no distributing environment or if there is something in the way or in-between the food. If the bacteria do not like the food it wouldn't grow or**

**show much bacteria. If the bacteria does not like the if the bacteria does like the food it will grow over and all around.**

- II) Hypothesis: If the bacteria like wet, dirty, microhabitats then a sample swabbed from inside Bella's mouth will produce a large number of bacteria.**

**If bacteria like dry, clean microhabitats, then a sample swabbed from inside a recently cleaned cabinet will produce a large number of bacteria colonies when swabbed on a dish of nutrient agar. If the bottom of the shoe collected the most bacteria then this is the best food for the bacteria found on the section of the kind of bacteria.**

- III) Experiment Plan: Mouth, toilet, floor, locker, white board full of marker, bottom of shoe computer screen**

#### **Materials**

**Nutrient agar plates**

**China marker**

**Applicator swabs**

#### **Procedure**

- 1) Be sure to follow sterile techniques during this lab so that contamination doesn't occur and ruin the results of this lab.**
- 2) Using the china marker, draw a line on the bottom of your nutrient agar Petri dish dividing it in half. Number each half with a different number.**
- 3) Select a variety of microhabitats to test for the presence of bacteria. Record the microhabitats in your data table. Identify characteristics of this microhabitat and record in your data table. (Wet or dry, light or dark, clean or dirty, isolated or high-traffic)**
- 4) With a sterile applicator stick, swab the given microhabitat.**
- 5) Streak the swab across the center of the nutrient agar plate section in a straight line, beginning and ending about 2cm from each edge of the dish. Do not break through the nutrient agar. Try to keep each streak mark the same size. Remember, you will be applying two different streak marks from two different microhabitats to each nutrient agar plate. Keep the cover off the dish for as little time as possible.**
- 6) Discard the applicator stick in the manner instructed by Mr. Ogden.**
- 7) Repeat steps 4-6 for the other microhabitats.**
- 8) Mr. Ogden will leave one dish untouched as a control.**
- 9) Incubate the dishes for at least five days.**
- 10) Record the growth of the microorganism on each plate in both qualitative and quantitative terms in the data collection section of this lab.**

#### **Experimental Components**

**Manipulated (Independent) Variable: different habitats**

**Responding (Dependent) Variable: The growth of the bacteria and from each habitat that are swabbed.**

**Controlled (Constants) Variables: the time we let it grow -Container, temperature,**

**Control: a disk of agar only**

**Data Collection:**

**Observations:**

**Section 1: Has some little spots scattered around the section**

**Section 2: Barley changed.**

**Section 3: Cracked through the agar**

**Section 4: Have some medium size bacteria spots.**

**Section 5: Ate through the agar and started to form a bubble of bacteria.**

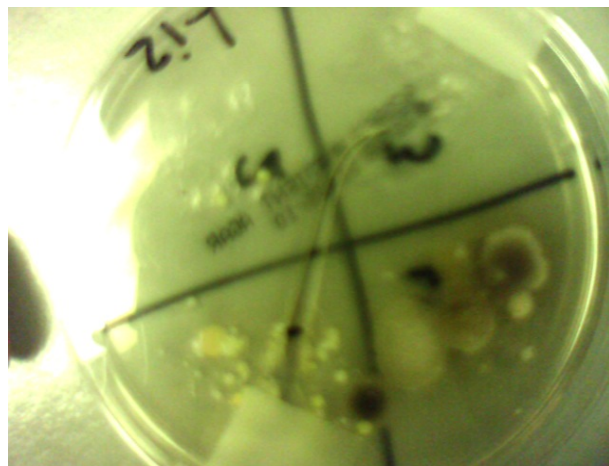
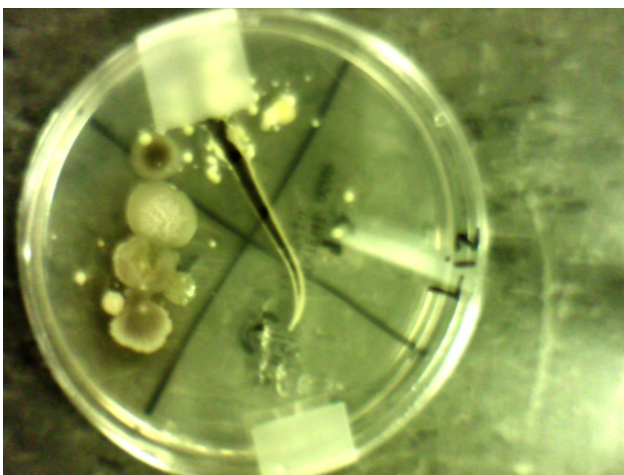
**Section 6: Made a big gap through the agar.**

**Section 7: Really liked Bella's Mouth**

**Section 8: nothing**

**Data Table:**

<b>Section Number</b>	<b>Microhabitat</b>	<b>Microhabitat characteristics:</b>	<b>Amount of bacteria 10-numerous/1- very few</b>
<b>1</b>	<b>Bottom of shoe</b>	<b>Dry , dirty, high-traffic</b>	<b>5-10</b>
<b>2</b>	<b>Computer screen</b>	<b>Dry, dusty,</b>	<b>2-10</b>
<b>3</b>	<b>White board full of marker</b>	<b>Dry, dirty, high-traffic</b>	<b>4-10</b>
<b>4</b>	<b>Locker</b>	<b>Dry, dirty,high-traffic</b>	<b>8-10</b>
<b>5</b>	<b>Floor</b>	<b>Dry, dirty, high-traffic</b>	<b>7-10</b>
<b>6</b>	<b>Toilet</b>	<b>Wet, dirty, high-traffic</b>	<b>6-10</b>
<b>7</b>	<b>Mouth</b>	<b>Wet, warm, dirty/sick,</b>	<b>1-10</b>



1. *It was important to keep the agar plates uncovered for as short as possible because the plate of bacteria and agar can come from the table or from the container if it is not covered.*
2. *It was important to use a new sterile swab because if you use the same swab over and over then the bacteria will be mixed all together with other bacteria's.*
3. *The agar was sterilized before using it because if we have anything else in the agar then it will mix with the other things in the agar and will not turn out correct.*
4. *If the biologists used old vegetables then there could be other germs growing on it.*
5. *My purpose of my control was that to make sure that the agar does not normally grow bacteria by itself.*
6. *The most bacterial growth was Bella's mouth and the toilet.*
7. *The least bacterial growth was on the computer screen.*
8. *The characteristics that affected the growth were wetness, warmth, and dark.*
9. *No because, they could have different colors or sizes too.*
10. *No, they had different colors and shapes, so they are probably different kinds.*