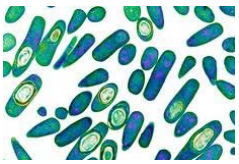
Bio 11
Chap 17
pg 360-377



Name: _____

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Growing Bacterial Samples from our School

The invention of the microscope by Anton van Leeuwenhoek has led to many remarkable discoveries. One of these discoveries is that tiny, microscopic living things called microbes are actually the most common living thing on the entire planet! You may not be able to see them but microbes are everywhere- on your skin, in your food, in your home & in all different types of environments in nature! In fact, the oldest organism on Earth AND the one that makes up the majority of Earth's biomass is now believed to be **bacteria**.

Bacteria are very **tiny living things** made up of **prokaryotic cells-** that means bacteria **DO NOT have a nucleus** or **membrane bound organelles**. However, bacteria **DO HAVE** a **cell wall, ribosomes and DNA**. Some bacteria can be helpful to humans and some bacteria can cause disease or even death. When working with bacteria, classification & identification can be useful and especially important to prevent the spread of disease or health problems.

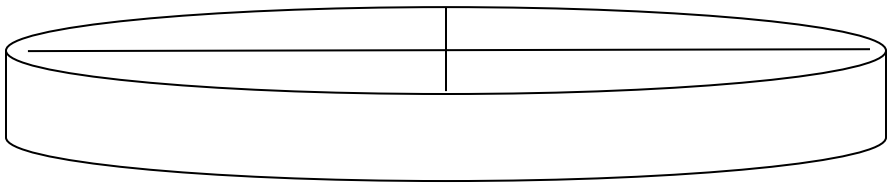
Purpose: To collect bacteria samples from a variety of sources in our School and to grow these samples on a nutrient agar plate.

Materials: 1 nutrient agar plate, 1 permanent felt pen, 4 cotton swabs, 1 incubator

Procedure: **DAY 1: OBTAIN BACTERIAL SAMPLES**

1) Label the bottom edge of you agar plate with you & your partner's names, date & block. Divide your plate into 4 equal sections along the bottom.

Figure 1:

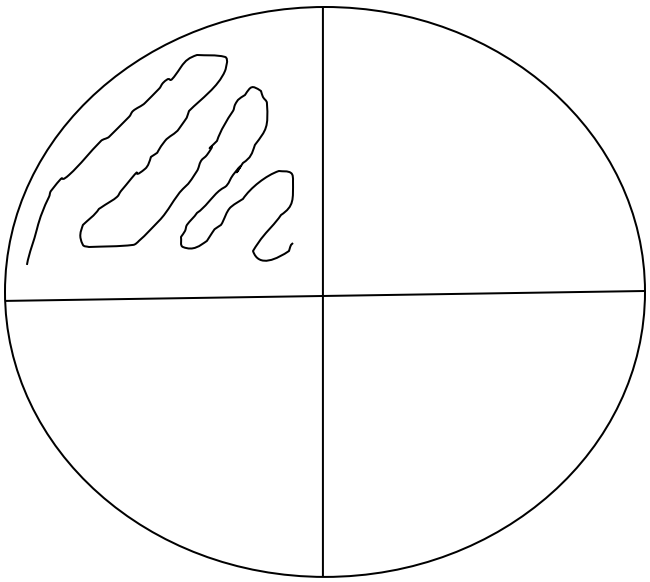


2) Label each of the 4 sections with the name of the location / source you will collect your sample from.

****DO NOT OBTAIN SAMPLES FROM THE WASHROOMS OR CAFETERIA****

3) Obtain your first sample by swirling a clean cotton swab along the surface of your chosen object/location. Next, **gently streak** the cotton swab along your agar plate starting by the edge and making an "S" shaped motion towards the middle of the agar plate. Be careful **NOT TO PUNCTURE the agar**! **Put the lid back on immediately & make sure your object /location is labeled in the correct quadrant! Dispose of the swab in the container provided.**

Figure 2:



4) Obtain **a NEW COTTON SWAB** and repeat step 3 for each of the remaining 3 objects/locations (using a NEW SWAB for each sample)

5) Once you have obtained 4 different samples, **tape the lid of your agar plate to the base with 1-2 small pieces of masking tape on opposite edges**. **Now, place your plate UPSIDE DOWN in the incubator**. **It must be upside down so that any condensation will drip into the lid and NOT onto the agar- otherwise the moisture may drown or dissolve bacterial colonies!

DAY 2: OBSERVE BACTERIAL COLONIES

Background Info:

Bacteria becomes visible to the human eye after many many rounds of cell division / reproduction result in the formation of bacterial colonies. Bacterial cells reproduce asexually using binary fission, conjugation and spore formation. All of these methods produce clones that are exact copies of the original parent cell. A typical bacterial colony has 1 billion bacterial cells!

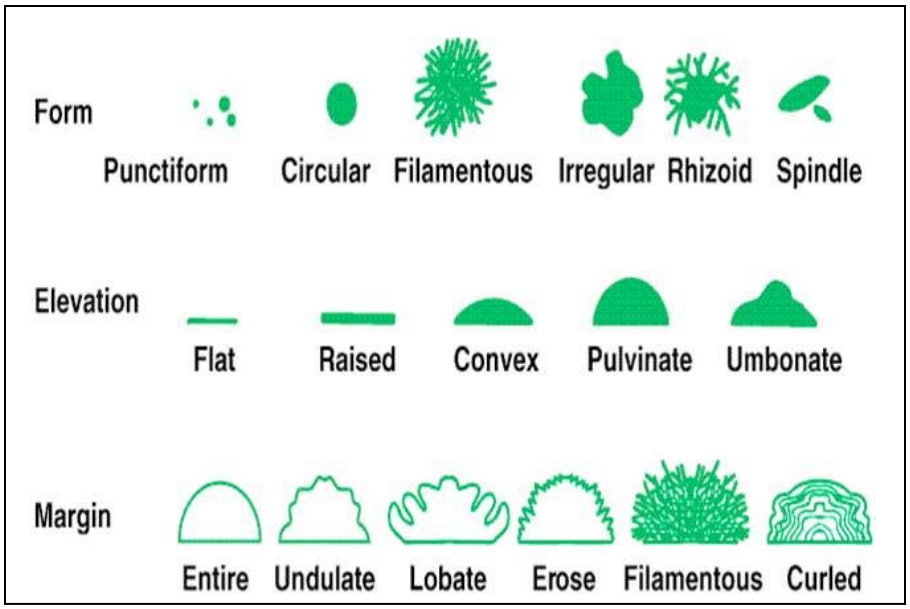
Observing the characteristics of bacterial colonies is helpful in identifying and classifying bacterial species. The classification process can be helped by observing the form, elevation and margin of bacterial colonies

Procedure: 1) Retrieve your nutrient agar plate and bacteria from the incubator.

2) Use a pencil make a DETAILLED sketch of all the colonies you found on your agar plate under Figure 1a in the **Results** section of your lab.

3) Use Table 1 to help describe the colonies you observe in Table 1a of the **Results** section

Table 1:



Results:

Figure 1a: Sketches of Bacterial Colonies on Nutrient Agar Plate

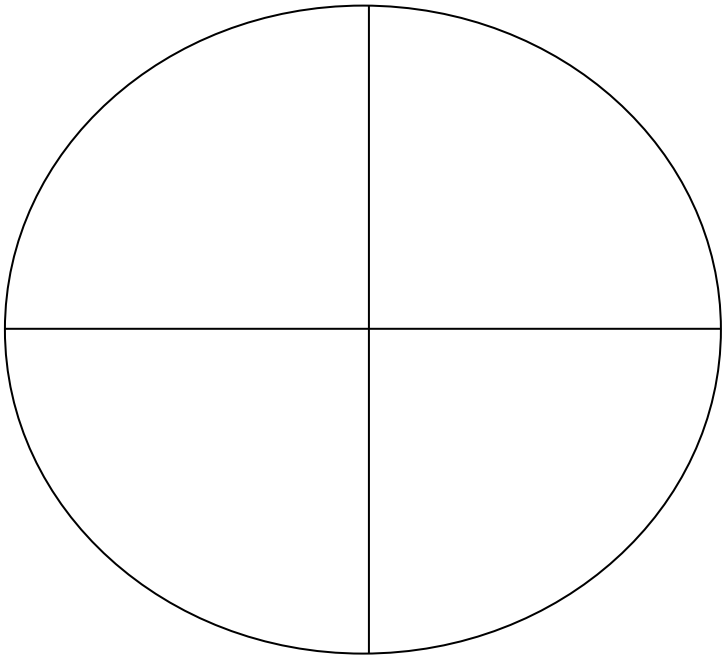


Table 1a: Descriptions of Bacterial Colonies

Sample 1: _____	Sample 2: _____	Sample 3: _____	Sample 4: _____

Discussion Questions: *SEE TEXT Sec 17.2 pg 360-377*

1. **Why are bacterial cells so much smaller than plant or animal cells?**

2. Give 2 reasons to help explain why bacteria are the most common living thing on Earth.

3. In this experiment were you able to observe the shape of a single bacterial cell? Why/Why not? What are the possible basic shapes of bacterial cells?

4. Microbiologists will often use a Gram Staining Technique to classify bacteria. Explain the difference between Gram Negative and Gram Positive Bacteria. Would this be a useful technique in this experiment? Why or Why not?

5. Compare and Contrast the three methods bacteria may use to reproduce.

6. Why must bacterial plates be incubated upside down?

Conclusion: *Summarize the results & big of this experiment. Address sources of error and ideas for improvement or expansion next time. Explain your suggestions!*

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	1 Just starting out	2 Developing Ideas	3 In progress	4 Getting there	5 Got it!	6 Rock Star!!
Scientific Drawings & Observations						• In Pencil • Detailed drawings • Detailed Descriptions • Accurate • Includes all Labels • Shows what you see • Drawn to scale
Discussion Questions ***(Weighted X2)***						• Uses full sentences • All Qs Fully Completed • Detailed • Clear & Accurate answers • Use of examples to support ideas • High Level of Understanding Shown
Conclusion						• Uses full sentences • Addresses purpose • Written in 3rd person • Clearly & Accurately Sums up big ideas • Detailed yet concise • Addresses Scientific Sources of Error • Makes & explains Sci. • Suggestions/improvement

Evaluated by: _____

What's Working ☺: ☆**What's Not:** **What's Next:**