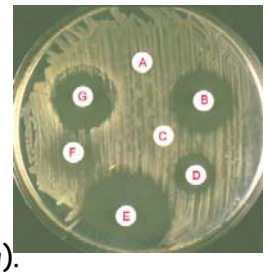
Bio 11 Name: _____

Chap 17 **Using the Kirby-Bauer Disk Method to Interpret the** Date: _____

Pg 374-375 **Effectiveness of a Variety of Antimicrobial Agents** Block: ____

A common method of testing an antimicrobial agent's effectiveness is to use the **Kirby-Bauer Disk Method** (as outline in the procedure section of this lab handout). In order to interpret the results obtained using this technique, **a zone of inhibition** is measured. The **zone of inhibition** is essentially the area on a nutrient agar plate that is **free of any bacterial growth** as indicated by a "clearing". The zone of inhibition can be obtained in mm by using a ruler to measure one edge of the clearing to the next (taking the diameter of the clearing).



The size of the zone of inhibition can then be used to gage the effectiveness of the antimicrobial agent at stopping or controlling bacterial growth. If **NO** zone of inhibition is visible the bacterial species being tested is **RESISTANT** to the antimicrobial agent and hence, growth is **NOT prohibited**. If the bacterial species is **SUSCEPTIBLE** to the antimicrobial agent then such an agent kills or inhibits / slows the growth of this particular bacterial species.

Purpose: To determine the effectiveness of a variety of antimicrobial agents such as disinfectants, hand sanitizers, antiseptics and antibiotics killing or inhibiting the growth of bacteria,

Materials: 1 nutrient agar plate containing a "lawn' of bacteria with a control disk and 3 antimicrobial disks (from last class), a ruler with a mm scale

Procedure: 1) Remove your nutrient agar plate from last day from the incubator

2) **WITHOUT REMOVING THE LID**, use **a ruler to measure each zone of inhibition**. Place the ruler at one edge of the clearing and measure the distance to the opposite edge of the clearing. **Repeat for each disk (control + 3 antimicrobials)** and record your results in a data Table 1 under the results section.

If there is no zone of inhibition visible to/apparent record the zone of inhibition as "less than 7mm" (this is the diameter of each disk).

3) **Draw the bacterial lawns & zones of inhibition in a Figure under the Results section**.

* *Be sure to label the quadrants in your diagram with the corresponding antimicrobial agents. Include & underline the words "Figure 1:" and a descriptive title. Don't forget to draw in pencil, trace a beaker/round object and use an unlined sheet of paper!*

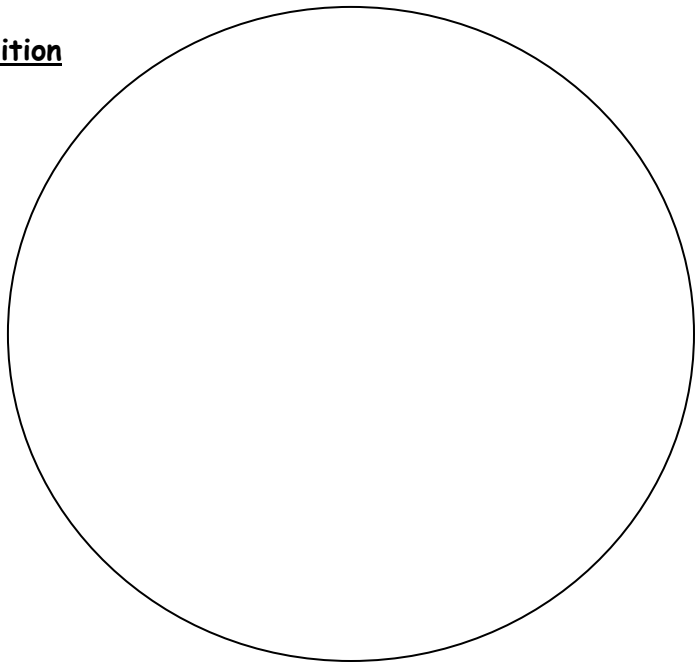
4) Disinfect your work area and return all equipment.

Results & Observations:

Table 1: Zones of Inhibition Observed Using a Variety of Antimicrobial agents

Quadrant / Antimicrobial Name	Measurement of the Zone of Inhibition	Description of Growth Observed on the Agar Plate	Ranking of Effectiveness 1=most effective 4= least effective
1. CONTROL			
2.			
3.			
4.			

Figure 1: Zones of Inhibition



Discussion Questions:

1a. Which antimicrobial was the most effective and which was the least effective? Did this match your predictions from Lab 4a? Explain why you think this is!

b) Did your results indicate that the bacteria were resistant to any of the antimicrobials? How could you tell?

2. Use what you know about evolution and genetics to describe the dangerous implications of the overuse of antibiotics in modern society.

3. Describe two ways that bacteria can generally cause disease.

4. What exactly is an antibiotic? Name a specific antibiotic and a specific disease it can be used to treat.

5. Briefly explain how an antibiotic works.

6. Other than antibiotics name and describe two other ways to control the growth of bacteria.

Conclusion: *Summarize the results & big ideas of this experiment. Did your results match your predictions why or why not? Address the sources of error and ideas for improvement or expansion of this lab for next time. Explain your suggestions!*
Summarize the evolutionary implications of your findings and the societal impacts. Should doctors prescribe more antibiotics or new antibiotics or both? Why or why not?

	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 • Underlined Fig # Title
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 • Applies knowledge to discuss implications of results

Coached by: _____

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