Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_

[Virtual Bacterial Growth Lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS08/LS08.swf)

**What kills germs?**

Bacteria are **prokaryotic**, **one-celled** organisms. Individual bacterial cells are visible only with the aid of a high-powered microscope. Under proper nutritional and environmental conditions, bacteria can be grown in a laboratory. They are usually cultivated in sterile petri dishes containing a gelatin-like nutrient called agar.

Bacteria reproduce rapidly. Each single cell divides about every twenty minutes. When a population of bacteria has multiplied to a thousand or more cells, a pattern of growth called a **colony** can be seen with the naked eye. The specific shape and color of a bacterial colony can be used to identify the species of bacteria that form it.

Because bacteria multiply so rapidly, it is often necessary to control their growth in the human body, in food, and in the kitchen. Several varieties of products are used to control bacterial growth, including antibiotics, disinfectants, and antiseptics. All these products are antimicrobial agents. Different kinds of bacteria are sensitive to some chemicals and insensitive to others.

In this virtual lab, you will determine the effectiveness of different antimicrobial agents by inoculating agar in a petri dish with different pathogenic bacteria, adding various antimicrobial agents, and measuring the bacterial growth around each agent.

Objectives:

* Describe how bacterial cultures are grown and investigated in a laboratory
* Determine the effectiveness of antibiotics and antiseptics in inhibiting the growth of bacterial cultures

Procedure:

1. Inoculate the agar in the petri dish by clicking one of the test tubes containing a bacterial culture.
2. Vials 1-7 contain filter paper disks that have been soaked in antimicrobial agents such as antibacterial soap, household bleach, household disinfectant, penicillin, amoxicillin and erythromycin, or in sterile water (as a control). Drag a disk from each vial and place it in the petri dish.
3. Click the incubator to place the petri dish in it.
4. Click the red button on the incubator to turn it on. When the timer shows that 24 hours have passed, click the incubator to remove the petri dish.
5. Examine the patterns of bacterial growth. The colored area that covers most of the surface of the petri dish is the lawn culture of the bacteria- a visible layer of thousands of bacterial cells.
6. Drag the ruler to measure the diameters of the zones of inhibition around the disks (the tan areas).

**Table: Diameter of Zone of Inhibition (mm)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Bacterial Species | **Sterile Filter Paper (control)** | **Anti-bacterial Soap** | **Household Bleach** | **Household Disinfectant** | **Penicillin** | **Amoxicillin** | **Erythromycin** |
| *Hemophilus influenzae* |  |  |  |  |  |  |  |
| *Staphylococcus aureus* |  |  |  |  |  |  |  |
| *Streptococcus peumoniae* |  |  |  |  |  |  |  |

**Analysis Questions**

1. Which disinfectant/antiseptic AND which antibiotic was the most effective? How can you tell?
2. Which disinfectant/antiseptic was the least effective? How can you tell?
3. How can this information from this lab be used in the future when purchasing household antiseptics/disinfectants?
4. What was the purpose of incubating the petri dishes for 24 hours?
5. If you were responsible for getting rid of a serious staphylococcus “staph” infection that developed in the locker room at school, what steps would you take?
6. Why are different disinfectant/antiseptics not equally effective against all species of bacteria?

1. Scientists have observed that an antibiotic seems to lose its effectiveness against a particular population of bacteria after a prolonged period of time. Explain what is responsible for this phenomenon?
2. The doctor just told you that you have strep throat and gives you an antibiotic to take for ten days. Explain why it is important to take the antibiotic for the full 10 days even though you feel fine after only a few days.