

Name: _____

Class: _____

Date: _____

The Evolution of Bacteria Lab

Goal: Examine how bacteria, like **strep throat**, have evolved to resist antibiotics. Penicillin was the first ever antibiotic, invented in 1928. At first, penicillin would have killed strep throat easily. Today, the drug would be almost useless! But why?

Procedure:

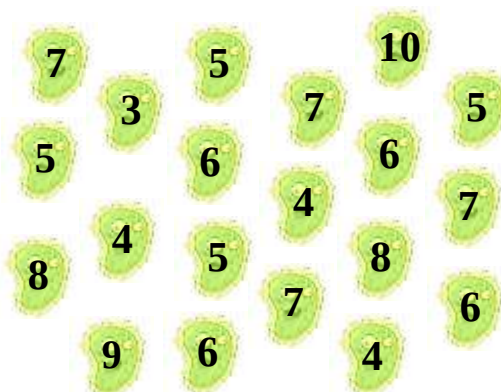
1. In this simulation, our bacterial colonies will consist of twenty different bacteria cells. The number on each cell represents how strong the bacteria are, on a scale from 1 to 10.
2. You will use two dice to represent the drug penicillin. If the two dice, added together, are higher than the number in the box, you will have successfully killed that bacteria cell. If it is lower-than or equal-to the number in the box, the bacteria cell lives on.
3. You will roll your dice for every single bacteria cell (meaning you roll 20 times each round). If there are only a few cells left, you can imagine that the body's immune system could easily handle killing off the last few bacteria cells.
4. A lot of times, an infection like strep throat will be passed on to a new person before the human body finishes killing it off. The bacteria reproduce and all of a sudden, a new person ends up with strep throat! In order to simulate this, copy over the leftover numbers as many times as you can, randomly filling in the new person's bacteria cells.

Example:



Your Penicillin Simulation:

One morning, Kate woke up with a very sore throat and a fever. The doctor said that it was strep throat!



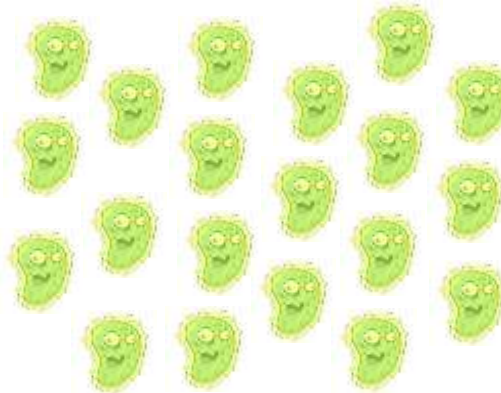
Kate was prescribed an antibiotic called penicillin. The drug killed off most of the bacteria, leaving her immune system to finish the job.

Kate was feeling much better. But before all of the bacteria were killed off, she shared a water bottle with Alyssa at soccer practice.



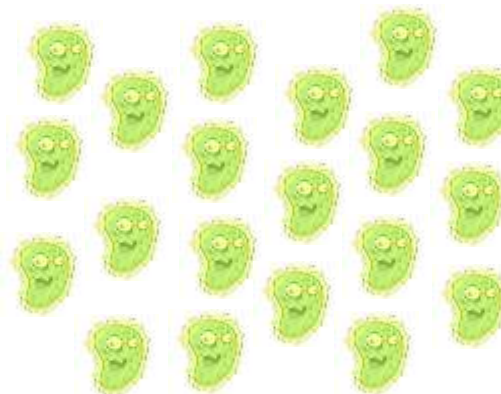
So Alyssa got sick. And when she went to the doctor, she was prescribed penicillin too. She took it, and it killed off a good portion of the infection.

Unfortunately, Alyssa had a classmate named Gino. One day in math class, Gino asked Alyssa if he could borrow a pencil, and accidentally caught some of Alyssa's germs.



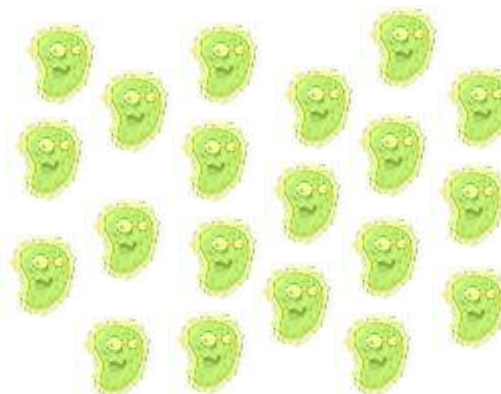
When Gino went to the doctor, they gave him the same prescription that they had given to Alyssa the week before: penicillin.

But before Gino was entirely cured, he went to the gym with Mike. After they shared a 5 lb. dumbbell, Mike caught some of Gino's germs.



Just two days later, Mike was in bed with a fever. When he went to the doctor he was given penicillin as well. It took him almost two weeks to feel better.

As soon as Mike felt up to it, he went back to school. But while sitting next to his friend Dylan at lunch, he accidentally coughed and passed on the strep infection.



Dylan eventually went to the doctor as well, and he too was prescribed penicillin. But this time, for some reason, it didn't get rid of the infection!

Post-Lab Conclusions:

1. What real-life characteristic of bacteria did the numbers in the cells symbolize?
2. In real life, why would a strong germ be more likely to have a baby that is also strong?
3. What happened to your population of bacteria as time went on? What is this process called?
4. What percentage of your bacteria survived Round #1 compared to Round #5?
5. Is bacteria evolving in real life? How so?
6. But how are real-life bacteria already evolving? I thought that evolution took millions of years!

EXTRA CREDIT:

You never know; tomorrow you might catch **strep throat** and get sick. How is your decision to take antibiotics going to help you? How is it going to affect others?