

## The Growth of Bacteria

Bacteria reproduce by a process called binary fission. It is a simple process that allows bacteria to divide once about every 20 minutes under ideal conditions. In this exercise, you will simulate the growth of bacteria over 10 generations. To complete this activity, you will need a cup of rice, 10 test tubes, and a test tube rack.

In this exercise, the bacteria will reproduce under ideal conditions. Therefore, they will double their numbers every generation. To visualize this growth, we will record their growth numerically and visually. Afterwards, we will represent this growth on a line graph.

We will start with one bacterium. The first two generations are done for you. Note the pattern and complete the last eight generations.

**Table 1: Ideal Growth of Bacteria Over Ten Generations**

Number of Divisions	1	2	3	4	5	6	7	8	9	10
Resulting Number of Bacteria	2	4								

To visualize this growth you will use rice to represent the bacteria. Set your test tubes in a line in front of you. Number your test tubes from 1 to 10. Using your supply of rice, place 2 grains of rice in test tube #1, 4 grains of rice in test tube #2, and so forth. Continue adding rice to each cup to represent the number of bacteria produced after each division.

After you have filled your test tubes with rice, you are ready to graph the growth. Once you plot the points on the graph, draw a curved line to show exponential growth.

### Conclusion:

1. How many bacteria were produced after 10 divisions?
2. The curve on your graph represents exponential growth. How would you describe the growth of the bacteria at the beginning of the activity compared to the end?
3. Predict in terms of minutes or hours how long it would take before the population of bacteria reaches 1,000,000.
4. As a result of this exercise, why do you think that it is important for your immune system to detect bacterial infections as soon as possible?
5. Normal cells in your body do not show this kind of growth. However, cancer cell growth resembles exponential growth. Why do you think this is detrimental for a living organism?