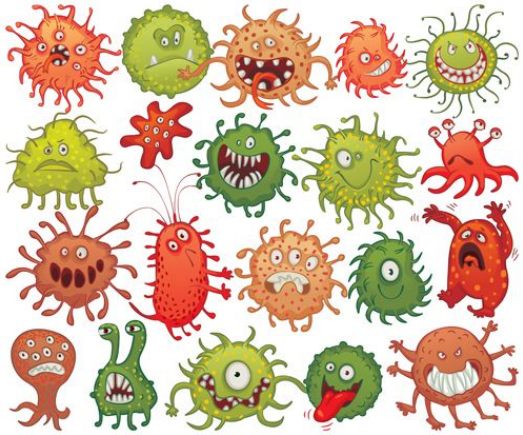
Science 9

The Growth of Bacteria

Name:
Date:
Block:



Bacteria reproduce by a process called binary fission. It is a 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.

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 the growth on a line graph.

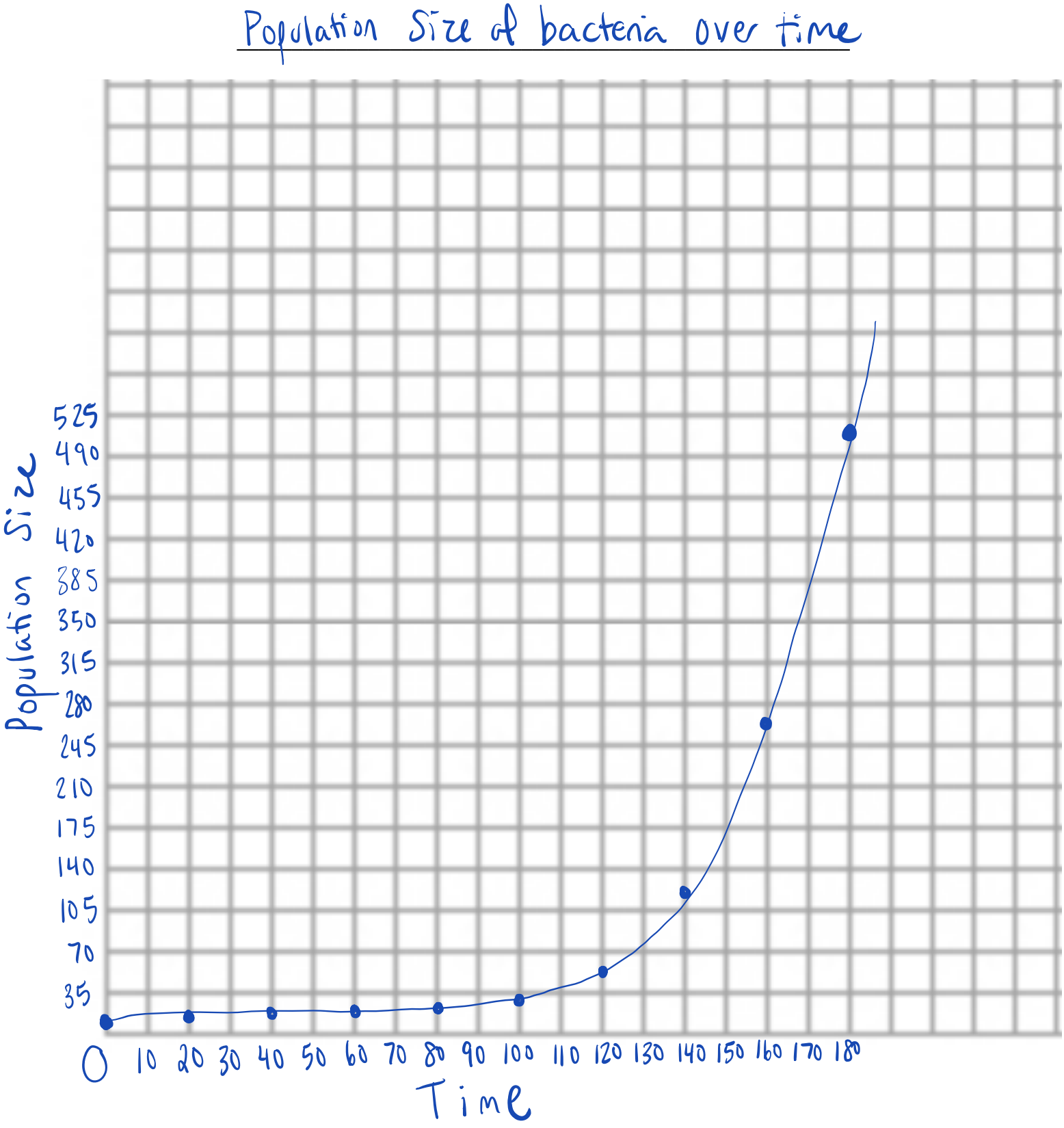
We will start with one bacterium and see how many bacteria will be reproduced after 10 generations.

Data Table:

Generation	Time	Population Size	Generation	Time	Population Size
1st	0 min	1	6th	100 min	32
2nd	20 min	2	7th	120 min	64
3rd	40 min	4	8th	140 min	128
4th	60 min	8	9th	160 min	256
5th	80 min	16	10th	180 min	512

+20 ↓ ×2 ↓

Graph:



Conclusion:

1. How does this activity represent binary fission?

It represents binary fission because it shows the population doubling each generation

2. What is the population size of your population after 10 generations have passed?

512 bacteria

3. 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?

In the beginning, the growth was slow

After ~100 min, the growth speeds up.

4. What is the population size of your population after 15 generations? Be sure to show how you got your answer.

10th 11th 12th 13th 14th 15th

512 x 2 x 2 x 2 x 2 x 2

= 16,384

5. If it takes 20 min for your bacteria to divide, how long would it take for your population to reach 15 generations? Remember that in Generation 1, the time is at 0 min. Be sure to show how you got your answer.

10th 11th 12th 13th 14th 15th

180 + 20 + 20 + 20 + 20 + 20

280 min

6. Calculate in terms of minutes or hours how long it would take before the population of bacteria to reach 1,000,000 bacteria. Be sure to support your response.

15th 20th 21st

16,384 x 2 x 2 x 2 x 2 x 2 x 2

halfway

~390 min

7. 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 bad for a living organism?

After a period of time, the cancer cells begin to outnumber our normal body cells.