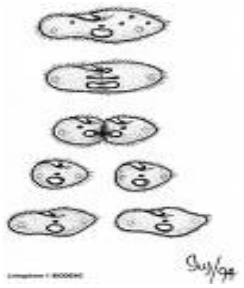
Applying Growth Rates



1. Under the best conditions, bacteria can divide every _____ minutes.

Tracking Bacterial Growth:

Use the chart below to track the growth of a single *E. coli* bacterium cell over several hours. Assume the cell has a generation time of 20 minutes. This means that every 20 minutes the cells divide, causing the amount of cells to double.

# of Divisions	Time Elapsed in Minutes	# of Cells
0	0	1
1	20	
2	40	
3	60	

2. One *E. coli* cell could multiply up to _____ cells in just 1 hour.

3. How many *E. coli* cells would there be after 2 hours? _____

4. How many *E. coli* cells would there be after 3 hours? _____

5. If it takes 128 cells of *E. coli* to make you sick, and the cells can divide as often as every 20 minutes, then how long would it take for one cell to grow enough to make you sick?

_____

Tracking Bacterial Growth:

Shigella (a type of bacteria) has a generation time of 40 minutes. Use the chart below to track the growth over several hours. Assume there are 4 cells present at start time.

# of Divisions	Time Elapsed in Minutes	# of Cells
0	0	4
1	40	
2	80	

6. How many *Shigella* cells would there be after 2 hours? _____

7. How many *Shigella* cells would there be after 4 hours? _____

8. In optimal conditions, how many times would *Shigella* cells divide in 2 hours?

Important information	
Total Time:	2 hrs
Generation Time:	40 min

Step 1: Convert the Total Time from hours to minutes

2 hrs = _____ min

Step 2: Divide Total Time by Generation Time

_____ min / _____ min = _____

9. In optimal conditions, how many times would *Shigella* cells divide in 6 hours?

Important information	
Total Time:	_____
Generation Time:	_____

10. In optimal conditions, how many times would *Shigella* cells divide in 8 hours?

Important information	
Total Time:	_____
Generation Time:	_____