

7-1 Exponential Functions, Growth, and Decay

A biologist is studying a type of cell that divides in two every hour. The biologist begins the experiment with a single cell. The population doubles every hour.

1. Complete the table.

Time (h)	0	1	2	3	4	5
Cells	1					

2. How many hours will it take until there are more than 500 cells?
3. How many cells will there be after 10 hours?
4. How many cells will there be after n hours?

THINK AND DISCUSS

5. **Explain** how you can write a function that models this situation.
6. **Describe** how your function would be different if the biologist started the experiment with 3 cells

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1. Complete the table.

Time (h)	0	1	2	3	4	5
Cells	1	2	4	8	16	32

2. How many hours will it take until there are more than 500 cells? 9
3. How many cells will there be after 10 hours? 1024
4. How many cells will there be after n hours? 2^n

THINK AND DISCUSS

5. **Explain** how you can write a function that models this situation.
6. **Describe** how your function would be different if the biologist started the experiment with 3 cells
 5. There are 2 times as many cells each hour as the previous hour and 1 cell initially, so $f(x) = 2^x$ models the situation.
 6. $f(x) = 3(2^x)$ would model the situation.