DATE: NAME: CLASS:

TOPIC 1.2 | **BLM 1.2-2**

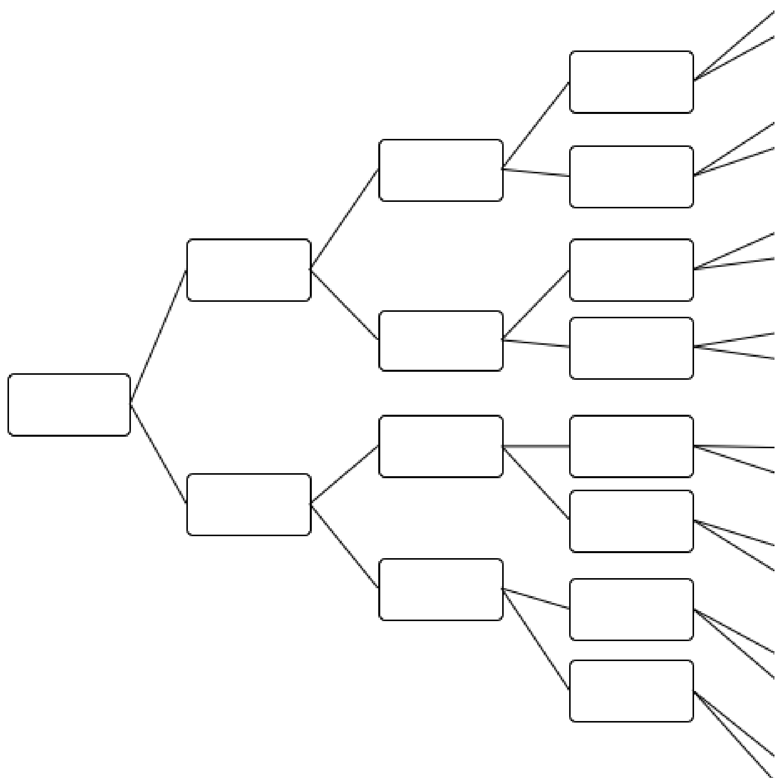
Activity: The Power of Doubling

Activity

The Power of Doubling

After each cycle of binary fission, the number of cells doubles. The time for many bacteria to double (called *doubling time*) is 20 to 30 min, so a small population can grow quickly to millions under the right conditions. What conditions do you think affect bacterial growth, and how do they affect it?

1. Complete the table below illustrating binary fission. First, finish the diagram for the 4th and 5th generations of bacteria, at the right. Then, summarize the numbers of bacterial cells in each generation below the diagram. Use a doubling time of 30 minutes.

Binary Fission						
Binary Fission Diagram						
Generation of offspring	**Start (0)**	**1st**	**2nd**	**3rd**	**4th**	**5th**
Number of cells	1	2	4			
Number of cells using base 2	2^0	2^1	2^2			
Time from start (hours)	0	0.5	1			

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Activity: The Power of Doubling

2. Consider the numbers of cells produced in binary fission, from your table, using the example shown. What do you notice about number of cells produced, when expressed in exponential form? Try to use base 2 and exponents to predict the number of bacterial cells that would be produced over longer periods of time. A calculator may be helpful to find your answer.

Time required (hours)	Generation of offspring	Number of cells using base 2 and exponents	Actual number of bacterial cells
0.5	1st	2^1	2
1	2nd	2^2	4
	3rd		
	4th		
	5th		
	10th		
	15th		
	20th		

3. What conditions might affect bacterial growth? List your ideas below, and describe how they could affect growth rates of bacteria.

Condition	How does this condition affect bacterial growth, and why?

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