Name: _____ Period: _____ Date: _____

Lesson 5: How Do Bacteria Grow?

Purpose: What question(s) did your class have at end of the last investigation?

_____

_____

_____

Prediction: If you could zoom in really close to see what was happening during this process, what do you think you would see?

_____

_____

_____

Investigation 1:

Procedure for Investigation 1

- Watch the time-lapse video of the bacteria in agar.
- Draw and/or summarize your observations to describe what you see a single bacterium doing that would cause the colony to increase in size over time.
- According to the video, how long does it take for one bacterium to reproduce? Record this in your observations to the right.

Observations

These materials were developed with funding through a grant from the Gordon and Betty Moore Foundation to Northwestern University and the University of Colorado Boulder.

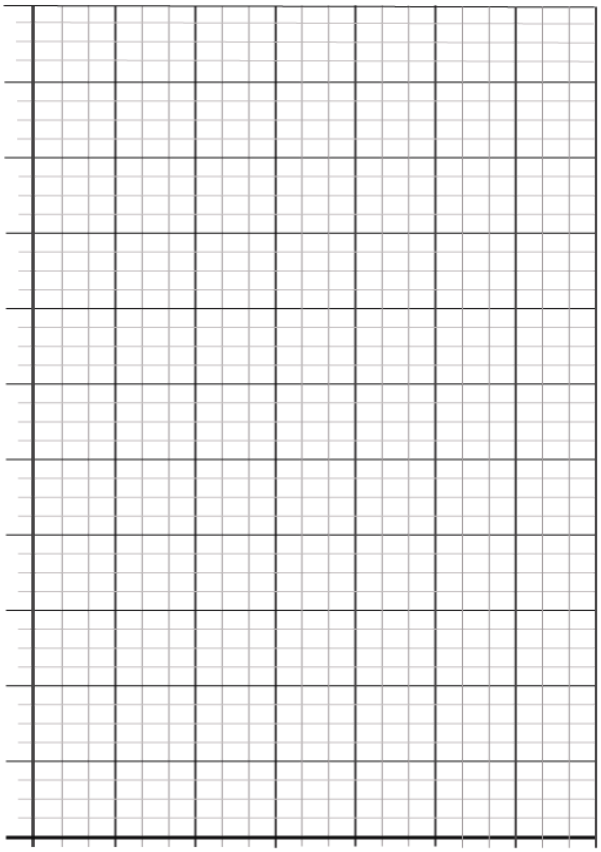
Making Sense of Investigation 1:

Use the time it takes a single bacterium to reproduce into two bacteria to do a quick calculation. How long would it take to end up with eight bacteria, if you started with one bacterium in this environment?

_____

Creating a Mathematical Model Investigation 1:
First complete the table showing the growth of the bacteria population over 400 minutes. Then construct a graph of the number of bacteria vs. time in hours.

Time (in min)	Time (in hrs)	Number of bacteria
0	0	1
400	6 ⅔	



Describe the pattern of change of population growth in the table and graph.

_____

_____

_____

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Conclusions for Investigation 1:

1. What are some discoveries your class made with regard to the question, *"Why did some of the Petri dishes appear to have no bacteria present and then days later they had visible bacteria?"*

2. How is what we discovered helpful for explaining what might have happened in Addie?

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Lesson 5 - Home-learning

Today in class you modeled what the growth of a bacteria population looked like if you started with a single bacterium. Then you critiqued some of the limitations of that model, when trying to use it to predict how bacteria might grow in a Petri dish, when starting with more than one bacterium, and starting with bacteria of different types or variations.

Next Steps: Scientists often build computer simulations to help investigate and visualize outcomes in systems that have parts in them that are too small to see. Computer simulations are programmed to have the objects and interactions that the user wants or needs. Think about what you would want to see included in such a computer simulation that would help you understand, explore, and predict how bacteria reproduce in a Petri dish.

- How would you want the computer to simulate a constant rate of bacteria growth?

- How would we want to visualize or keep track of one line of descendants from one bacterium vs. a line of descendants from another bacterium?

- What would be a reasonable assumption to include in the simulation, for what happens to bacteria growth when they reach the wall of the Petri dish, where there is no agar.

- What sort data would you want the simulation to graph automatically for you?

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