Name: ____ Period: _______ Date: ________

Lesson 9: What happening inside Addie?

Jigsaw Activity: What is your current thinking about why the antibiotics seemed to stop working for Addie?

Your group has been assigned one question paired with the phenomenon we used to investigate that question. Using this chart and your Incremental Model Tracking Tool, discuss how what you figured out in your assigned lesson serves as evidence for what we know about the questions below. Record any new thinking that we should add to our tracking tool in the four blank boxes below in the row that corresponds to your assigned question. Be prepared to share what you discuss in your group with the class in 10 minutes. Your sharing out should be limited to 2 minutes and focus on new information we should add to our tracking tool and questions we still need more information to answer so we can explain what is going on inside Addie. Circle the question you have been assigned. *Some of the chart has been filled out for you to get you started.*

1. Are there different kinds of bacteria? What's your evidence?
2. Are there different varieties of bacteria within the same kind? What makes a certain variety become a certain variety? What's your evidence?
3. Did the bacteria move into or out of the system? What's your evidence?
4. What was the stable environment like before antibiotics were added? What's your evidence?
5. Were antibiotics added to the environment? Are the antibiotics and the bacteria interacting? What's your evidence?
6. Were some of the bacteria dying? What's your evidence?
7. How are the bacteria reproducing? What evidence do we have of resources (such as food or space) affecting the reproduction of bacteria? What's your evidence?

Systems Comparison Chart: **Record your specific responses for your question in these boxes below.**

In previous NetLogo computer model	In Addie	In our Petri dishes	What do we want in a new computer model?

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Whole Group Consensus Discussion: As your classmates share out, record what your class agrees on for each question.

Systems Comparison Chart	**Key Mechanism related to this we included (or did not include) in the the models we made**		
Question	**In previous NetLogo computer model**	**In Addie**	**In the Petri dishes**
1. Are there varieties of bacteria within the same kind? What's your evidence?	We just had one kind of bacteria in the simulation. Our evidence is in the simulation we didn't call the bacteria different names. They all had the same basic shape and reproduction rate. There were different colors, but that doesn't seem like the same thing as a different kind.	Addie got infections of two different kinds. Our evidence is that the doctors called the bacteria MRSA for one kind and *Stenotrophomonas* for the second kind.	In the Petri dish we added just one kind. We used only *E.coli* from a company.
2. Are there different varieties of bacteria within the same kind? What makes a certain variety become a certain variety? What's your evidence?	There are 4 different varieties of bacteria within a kind in the simulation, and they are born with a specific variation. Our evidence is in the simulation we started with 4 variations with different colors and different numbers of pores. Only a purple with 3 pores can make a purple with 3 pores when they reproduce so they are born with the variety they have. It's in their genetic information to be a certain variety.		

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3. Did the bacteria move into or out of different environments (different systems)? What's your evidence?	The bacteria can be moved into the simulation environment. Our evidence is that we can tell the simulation to put in a certain number of each variation of bacteria. We can also move the bacteria within the simulation environment.		
4. What was the stable environment like before antibiotics were added? What's your evidence?	When there was no antibiotics, all varieties of bacteria reproduce at the same rate and have roughly the same number and proportion in the population when they are spaced out evenly to access the same resources. We saw evidence in the numbers produced of bacteria when we spaced out all bacteria evenly in the simulation.		
5. Were antibiotics added to the environment? Are the antibiotics and the bacteria interacting? What's your evidence?			

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6. Were some of the bacteria dying? What's your evidence?			
7. How are the bacteria reproducing? What evidence do we have of resources (such as food or space) affecting the populations of bacteria? What's your evidence?			

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Next Steps:

Scientists often revise and refine computer simulations to better understand complex phenomena.

In the previous simulation you used, you identified some important components and interactions that needed to be included based on what you knew about bacterial growth at that point.

Now that you know more information, what other objects and interactions did your class decide you wanted to add to that computer simulation that would help you understand and explore some of the phenomena you still have questions about?

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