**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

You will be using this model of a colon crypt to collect data and make predictions about cell counts. Choose a partner to work with for this activity. In part one and part two, each partner should decide what cell there are going to collect data on. Part three is focused on comparing and contrasting the data collected. These questions should be answered together.

**Part One:** First open the colon cancer model in *NetLogo*. Between you and your partner, decide if you want to focus on the daughter cells (blue circles) or on the goblet cells (pink circles).

* Press the “setup” button and wait for the picture to completely load.
* Turn the “Mutated?” button to the off position.
* Set the rate-of-duplication to 2.
* Also set the number of tick equal to 0.
* In order to start the computer simulation, press the “go” button.
* Record the number of cells.
* Increase the number of ticks to 25.
* Press the “go” button and record the number of cells.
* Repeat these steps, each time increase the number of ticks by 25 until the ticks reach 150. Record the number of cells each time in the chart below.

What kind of cell are you collecting data on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **Time (Number of Ticks)** | **Number of Cells** |
| 0 |  |
| 25 |  |
| 50 |  |
| 75 |  |
| 100 |  |
| 125 |  |
| 150 |  |

1. From the data you collected, plot the points.
2. Draw a line of best fit or a smooth curve from 0 to 75 and from 75 to 150. Why was it necessary to do this?
3. Is your graph a function? Why or why not?
4. Compare and contrast your graph to the graph in the model. What is different?
5. Is your graph directly proportional or inversely proportional to time? How do you know?
6. Based on your graph, predict the number of cells that will be there at 350 ticks. Run the simulation increasing the number of ticks to 175. Press the “go” button and record the number of cells present. Is your prediction similar? Why or why not?

**Part Two:** Between you and your partner, decide if you want to focus on the daughter cells (blue circles) or on the mutated cells (grey and black circles).

* Press the “setup” button and wait for the picture to completely load.
* Turn the “Mutated?” button to the on position.
* Set the rate-of-duplication to 2.
* Also set the number of tick equal to 0.
* In order to start the computer simulation, press the “go” button.
* Record the number of cells.
* Increase the number of ticks to 25.
* Press the “go” button and record the number of cells.
* Repeat these steps, each time increase the number of ticks by 25 until the ticks reach 150. Record the number of cells each time in the chart below.

What kind of cell are you collecting data on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **Time (Number of Ticks)** | **Number of Cells** |
| 0 |  |
| 25 |  |
| 50 |  |
| 75 |  |
| 100 |  |
| 125 |  |
| 150 |  |

1. From the data you collected, plot the points. Draw a line of best fit or a smooth curve depending on your data. Describe your graph using the terms exponential and linear.
2. Is your graph a function? Why or why not?
3. Compare and contrast your graph to the graph in the model. What is different?
4. Is your graph directly proportional or inversely proportional to time? How do you know?
5. Based on your graph, predict the number of cells that will be there at 175 ticks. Run the simulation increasing the number of ticks to 175. Press the “go” button and record the number of cells present. Is your prediction similar? Why or why not?

**Part Three:** With your partner, answer the following comparison and contrast questions.

1. How does the data you collected compare to the data that your partner collect? How do they contrast?
2. Compare and contrast the graphs of the healthy crypt to the graphs of the mutated crypt. Use proper terminology such as exponential and linear.