Name______________________________

Modeling Exponential Growth and Decay

Penny Lab: Modeling Growth of Cancer Cells

The purpose of this lab is to provide a simple model to illustrate the growth of cancerous cells.

In our experiment, a penny represents a cancerous cell. If the penny lands "tails" up, the cell divides into the "parent" cell and "daughter" cell. The cancerous cells divide like this uncontrollably-without end.

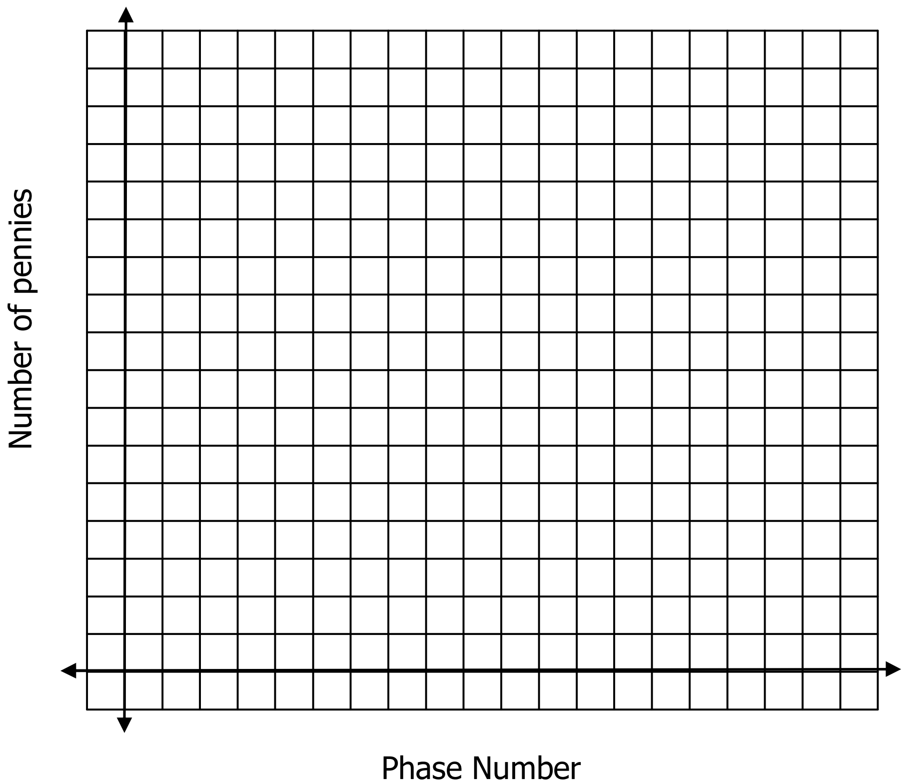
We will conduct 15 trials and record the number of "cancerous cells" in our cup.

Exponential Growth Procedure

1. Place 2 pennies in a cup. This is trail number 0.
2. Shake the cup and dump out the pennies. For each "tail" add a penny (the daughter cell) and record the total number of pennies going back into the cup.
3. Repeat step number 2 until you are done with 15 trials.

Trial Number	0	1	2	3	4	5	6	7	8	9	10
# of Pennies ***(cells)***	2										

1) Graph your data (scatterplot) with the trial number on the x-axis and the number of pennies on the y-axis.



Exponential Growth Discussion

2) Each time you shook the cup, about what percentage of pennies landed "tail" up?

3) To derive the exponential growth model for the number of pennies landing "tails" up:

Use the equation for exponential growth: $\mathbf{y = a\,(1+r)^t}$

Replace a with the number of pennies you started with a = ____________

Replace r with the rate of change r = _____________
(it is your answer from question #2)

Time period (number of trials) t = # of trials

Fill in the variables to derive your own exponential growth model:

4) Use the exponential growth model derived to predict the number of "cancerous cells" there would be in
   a) Trial 25
   b) Trial 50
   c) Trial 100