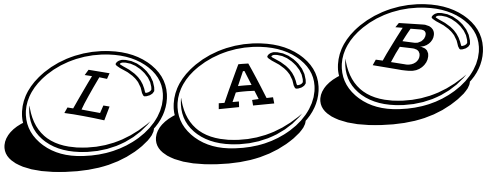


Growth

Mathematical Simulation of Rate of Growth

A exponential growth function is one in which the values increase by a nonlinear, but still constant, factor. These functions are often used to model the growth of populations.

Materials:

M&M's in canisters or in a bulk package
Graphing Calculator
Small paper cup (if bulk package is used)
Paper towel (or clean piece of paper)

Activity:

1. Each participant starts with **only 4** M&M's in a cup (or canister) and a paper towel.

2. Record the trial $t = 0$ value as 4 in your chart.

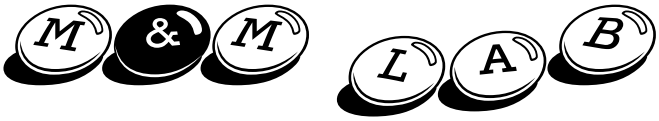
3. Shake the cup and pour the M&M's out on the paper towel. Count the number of M&M's that have the ***M*** showing. Add an M&M for each one with an ***M*** showing. Record the **total** number of M&M's under $t = 1$. Return all of the M&M's to the cup or canister.

4. Shake the cup and pour the M&M's out on the paper towel. Count the number of M&M's that have the ***M*** showing. Add an M&M for each one with an ***M*** showing. Record the **total** number of M&M's under $t = 2$. Return all of the M&M's to the cup or canister.

5. Repeat this process four more times.

6. When DONE, eat the M&M's (unless you need the M&M's for the "decay" experiment).

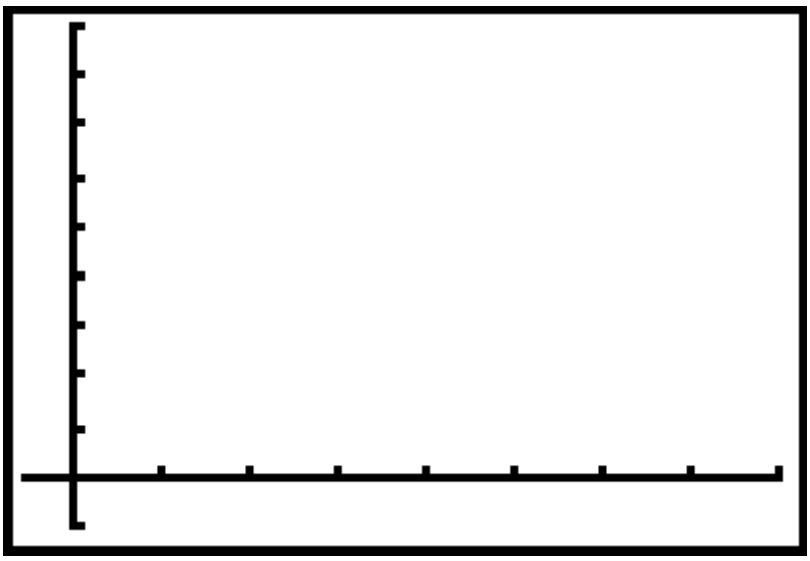
Growth



Name_____

Trial #	Total M&M's
0	**4**
1	
2	
3	
4	
5	
6	

1. Enter the data in lists L_1 (trial #) and L_2 (Total M&M's).



2. Create a scatter plot with the trial # on the *x*-axis and the total M&M's on the *y*-axis. Use the grid at the right.

3. Using STAT → CALC, find the best regression equation to model this data. Which regression model did you choose?_____
   What is your equation? _____

4. Sketch your regression equation on the graph with your scatter plot.

5. What is the correlation coefficient for your model equation? _____
   What is the coefficient of determination for your model equation?_____
   Is this considered a "good fit"? _____ How do you know? _____
   _____

6. Using your equation, predict the number of M&M's on trial #10. _____

7. Using your equation, predict the number of trials needed to produce a total of 400 M&M's._____

8. Explain what the "*a*" and "*b*" values in the equation represent.
   _____
   _____

9. Why does the "*b*" value seem to equal approximately 1.5?_____