**Penny Investigation**

Materials:

 100 Pennies

 Cup

 TI-83 Graphing Calculator

Steps:

1. In your group of two, open rolls of pennies and put the 100 pennies into your cup.
2. Shake up pennies and pour them onto the table.
3. Separate the pennies into Heads or Tails
4. Choose either Heads or Tails to count and discard the other.
5. Once you’ve counted, record data and put remaining pennies back in your cup and repeat the process with the remaining pennies.
6. Continue until all pennies are eliminated

Data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Toss # | PenniesRemaining | Toss # | PenniesRemaining | Toss # | PenniesRemaining |
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Create a graph below:

**\*\*Once all data has been collected and graph has been made, follow the directions on how to input your data in the TI-83 graphing calculator.**



Step 1: Press STAT; Press 1 (Edit)

Step 2: Begin entering data in L1 (Toss #1) and then L2 (Pennies Remaining)



Step 3: Press 2nd STAT PLOT; Press 1 (Plot 1) ; Put cursor on ON and enter.

Step 4: Press ZOOM; Press 9 (ZoomStat) and a graph will appear.



Step 5: To find the best-fit graph: Press STAT; Press CALC; Press 0 (ExpReg); The word “ExpReg” will appear on the screen. Press ENTER. You will see the following.

Step 6: Press Y=; Press VARS; Press 5 (Statistics); arrow over to EQ and Press 1 (RegEq). This will return you to the Y= screen with an exponential equation. Press GRAPH.

1. Will your data look different from another group if they decided to discard a different penny, for example, you decided to count heads and they decided to count tails?
2. What is your exponential equation given on the calculator?
3. What does the “a” represent?
4. What does the “b” represent?
5. What is your r2 value and what does it mean?
6. What is the mathematical model for exponential decay?
7. Explain why your equation does/ does not match the mathematical model.
8. What would allow your exponential equation to approach the mathematical model?