The Paper Folding Activity

Part I: Number of Sections

Number of Sections

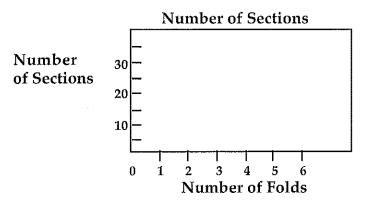| Number of Folds	Number of Sections
0	
1	
2	
3	
4	
5	
6	

1. Fold an 8.5 x 11" sheet of paper in half and determine the number of sections the paper has after you have made the fold.

2. Record this data in the table and continue in the same manner until it becomes too hard to fold the paper.

3. Make a scatter plot of your data.

Number of Sections

Number of Sections

30
20
10

0 1 2 3 4 5 6

Number of Folds

4.   Determine a mathematical model that represents this data by examining the patterns in the table.

5.   What might be different if you tried this experiment with an 8.5 x 11″ sheet of wax paper or tissue paper?

Part II: Area of Smallest Section

Area of Smallest Section

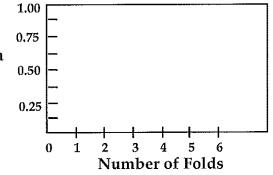| Number of Folds	Area of Smallest Section
0	1
1	
2	
3	
4	
5	
6	

6.   Fold an 8.5 x 11″ sheet of paper in half and determine the area of the smallest section after you have made the fold.

7.   Record this data in the table and continue in the same manner until it becomes too hard to fold the paper.

8.   Make a scatter plot of your data.

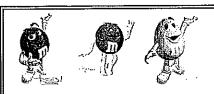9.   Determine a mathematical model that represents this data by examining the patterns in the table.

> **Did you know that paper was invented by the Chinese about 105 AD?**

Area of Smallest Section

Area of Smallest Section

1.00
0.75
0.50
0.25

0   1   2   3   4   5   6

Number of Folds

The "M&M"® Investigation
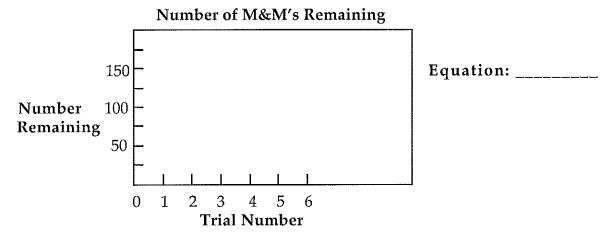
Part 1: Collecting Data

1. Empty your cup of M&M's and count them. Record this total in the space next to trial number 0. Place the candies back into the cup. Mix them well and pour them out into the box top. Remove the M&M's that show an "m" – you can eat these. Count the number left and record this number into your table. Repeat this procedure until the number of M&M's remaining is less than 5 but greater than 0.

Number of M&M's Remaining

Trial Number	Number of M&M's remaining
0	
1	
2	
3	
4	
5	
6	

Part 2: Graphing and Determining the Exponential Model

2. Use a graphing calculator to make a scatterplot of your data. Copy your scatter plot onto the grid below. The use the graphing calculator to determine an exponential model, and graph that equation. Sketch in the graph, and write your exponential equation.

Number of M&M's Remaining

Number Remaining

150

100

50

0 1 2 3 4 5 6
Trial Number

Equation: _____

Part 3: Interpreting the Data

3. In your model, $y = a(b)^x$, what value do you have for a? What does that seem to relate to when you consider your data? When $x = 0$, what is your function value? Compare this to the values in your data table.

4. What is the value for b in your exponential model? How does this value relate to the data collection process?

5. How does the M&M experiment compare to the paper folding activity? How are they alike and how are they different?

Directions For Using the TI-82 to: Graph a Scatter Plot, Determine an Exponential Model, and Graph the Model

To enter data:

STAT 1:EDIT ENTER

(Clear all lists by using the up arrow button to go to the top and pushing clear.)

Enter data with L1 as the independent variable and L2 as the dependent variable.

To plot scatter graph:

2nd Y (STAT PLOT) 1:PLOT1 ENTER

Plot on; type scatter (1st).

X list: L1; Y list: L2; Mark: 1st symbol.

To choose window and graph:

ZOOM 9:ZoomStat ENTER

> YOU SHOULD SEE A SCATTER PLOT.

To find the exponential regression:

STAT CALC A:ExpReg ENTER

To graph the line:

Y= VARS 5:Statistics EQ 7:RegEQ GRAPH

> YOU SHOULD GET A CURVE THOUGH THE SCATTER PLOT.