The One-Cent Event

Math Concepts

- Statistics
- Entering data into lists

Materials

- TI-73
- Two coins

Overview

This activity helps students understand the basic concepts of statistics and how to use lists to perform calculations on the data collected.

Introduction

1. In your group, determine the method needed to allow a coin that is balanced on its edge to fall face up, or face down.

2. Share this experimental ecosystem with the class.

3. Identify the variables in the experiment, and determine the best method to collect the data, for 25 "falls" of a coin.

4. Collect data in the following format for the 25 events, and total:

Heads	Tails
|||| ||||	|||| ||||

5. Record the date of publication for your coin, and its denomination.

Coin: _____ Year: _____

6. Repeat the process for your other coin.

7. Offer your data to the class, and collect the results for the penny, and the other coin you used.

8. Get all the relevant class data. Enter this data in the List on the TI-73.

L**H1**	L**T1**	L**H5**	L**T5**
12	13	12	13
10	15	13	12
15	10	12	13

9. We now want to look at the pattern in the numbers.

- How do the results for your group "fit" with the others?
- What would you predict about the results from another group's data?
- What would happen if the coin "fell" 100 times?
- What is the difference in the data from the penny and the other coin?
- How does this data vary from the truth, as we knew it?

10. To help answer this question, make a Scatter Plot of the data.

11. As we look at the data, it would be interesting to divide the data (universe?) into parts.

12. This can be done in two ways.

- First use the Horizontal and Vertical Line functions on the TI-73 and make 4 pseudo Quadrants.
- Where is our data? Why?
- What does it mean to be in a particular Quadrant?

13. A more useful line to examine is the Y = X line. This line is all-powerful and knowing. It will lead us to the solution in many experiments.

- In this case, look at the questions we had above, and try to answer from the perspective of two Quadrants.
- Add Y = -X and look at the 4 Quadrants.

14. Look at the data for your coin with a Histogram.

- Stacked histogram?
- Box-and-whiskers plot?
- What about 1-var Stats?

15. If we want to find out the probability that a coin would fall face down, or up, we can accumulate the data by using the cumSum(option.

- Graph the number of falls vs. the probability of falling face up/down.
- As you see, as the amount of data increases, there is a tendency to a certain point (probability).
- Is it what you expected? Predicted?
- This is an experimental probability. How do you get a theoretical probability for this scenario?

16. Now look at a graph of Total Number of Trials (X) and the Total Number of Heads (Y). What is the slope of this line?

Total Trials	Total Heads
25	
50	
75	
100	
…	

17. What if you spin the coin, on edge, and collect data on the fall?

- How do the different coins vary?
- What are the problems with these coins?
- What if you dropped a coin to land on its edge, and collected data from that fall?

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