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| M&M™s Statistics: Pre-Lab Activity |  logo black |

**Pre-Lab Activity**

The following activity will introduce the basic concept used to determine how survivorship within a population is determined over time. A LARGE bag of M&M™s will represent a local graveyard and each M&M™ will represent one gravestone within that graveyard. Each team has a container of M&M™s to represent one section within that graveyard which you will use to collect your data. *DO NOT EAT ANY M&M™S UNTIL YOU HAVE COLLECTED THE DATA!*

**Procedure**

1. Work in pairs.
2. One member of the pair will obtain a container of M&M™s.
3. Organize the M&M™s by color. Count the number of each color and organize them on your paper towels in the following order: Brown, Red, Yellow, Green, Orange, and Blue.
4. Record the number of M&M™s above each group and add to the class data on the board.
5. When class data is totaled, record those class totals in the data table on the next page.
6. Follow the instructions above each column in the table to calculate each variable. Your goal is to complete this life table to determine the Survivorship of this population of M&M™s.
7. Each column represents a specific variable:
8. **Age Interval**: represented by a specific color of M&M™
	* Read each value, no data to input.
9. **Total number of individuals** (dx) who died in this age range
10. **Proportion of total deaths in the time interval**: divide each color count of M&M™s by the total number of M&M™s.
11. **Number of deaths in a normalized dataset of 1000**: Multiply Column C **x 1000** by moving the decimal three places (dx).
12. **Survivorship** (lx) = Beginning with a total population of 1000, subtract the number of individuals who die (column D) in each time interval.

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| **A. Age Interval (years old)** | **B.** **Total number of individuals who died in this age range (dx)**  | **C.** **Proportion of total deaths in the time interval** | **D.** **Number of deaths in a normalized dataset of 1000** | **E.** **Survivorship (lx)** |
| Represented by a specific color of M&M™. |  | Divide each color count of M&M™s by total number of M&M™s. | Multiply Column C x 1000. | Beginning with a total population of 1000, subtract the number of individuals who die (Column D) in each time interval. |
| 0-9.9*Brown* |  |  |  | 1000 |
| 10-19.9*Red* |  |  |  |  |
| 20-29.9*Yellow* |  |  |  |  |
| 30-39.9*Green* |  |  |  |  |
| 40-49.9*Orange* |  |  |  |  |
| 50-59.9*Blue* |  |  |  |  |
| TOTAL: |  |  |  |  |



On the graph provided, label the Y-axis with the survivorship data from 0-1000. Note that this is semi-log graph paper. Ask for help if you do not know how to label the axis.

The X-axis represents time intervals. The M&M™ data only has six intervals, so you can spread out the data.

**Now Try This**

Plot this squirrel data (in table below) on the same graph grid as the M&M™ data.

**Life Table for Belding’s ground squirrels in the Sierra Nevada Mountains of California.**

|  |  |  |
| --- | --- | --- |
| **x** | **Lx** | **dx** |
| Age interval(in years) | Number of individuals alive at beginning of age interval (based on 1000) | Number of individuals who die during the age interval (based on 1000 total individuals) |
| 0-1 | 1000 | 426 |
| 1-2 | 574 | 311 |
| 2-3 | 263 | 146 |
| 3-4 | 117 | 63 |
| 4-5 | 54 | 29 |
| 5-6 | 25 | 13 |
| 6-7 | 12 | 6 |
| 7-8 | 6 | 3 |
| 8-9 | 3 | 2 |
| 9-10 | 1 | 1 |

*Source: Data from P.W. Sherman and M.L. Morton “Demography of Belding’s Ground Squirrel” Ecology 65 (1984).*