**BIOLOGY 2022-23 August 25, 2022**

**Today’s Agenda (Day 8)**

1. HOUSEKEEPING ITEMS

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1. Homework Check:

🡪 Chapter 1 Vocabulary

🡪 M & M Statistics

1. Class Activity:

🡪CONT’D: Ch 1 PPT Review

1. ~~Section 1.1 – Intro to Biology~~
2. ~~Section 1.2 – The Nature of Science~~
3. Section 1.3 – Methods of Science

🡪BEGIN: Ch 2 PPT Review

1. Section 2.1 – Organisms and Their Relationships
2. Section 2.2 – Flow of Energy in an Ecosystem
3. Section 2.3 – Cycling of Matter

HOMEWORK:

* READ: Chapter 1 – The Study of Life
* READ: Chapter 2 – Principles of Ecology
* COMPLETE: Chapter 1 Notes, Chapter 2 Vocabulary
* STUDY: Ch 1 & 2 Vocabulary, Ch 1 & 2 Test

CHAPTER 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Adaptation | Biology | Constant | Control group | Data | Dependent variable |
| Development | Ethics | Experiment | Experimental group | Growth | Homeostasis |
| Hypothesis | Independent variable | Inference  | Law | Metric system | Observation |
| Organism | Organization | Peer review |  Reproduction | Response | Science |
| Scientific method | SI | Species | Stimulus | theory |  |

CHAPTER 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Abiotic factor | Autotroph | Biogeochemical cycle | Biological community | Biomass | Biome |
| Biosphere | Carnivore | Commensalism | Denitrification | Detritivore | Ecology |
| Ecosystem | Food chain | Food web |  Habitat | Herbivore | Heterotroph |
| Matter  | Nutrient | Mutualism | Niche | Nitrogen fixation | Omnivore |
| Parasitism | Population | Predation | Symbiosis | Trophic level |  |

REMINDERS:

* ~~M & M Statistics – Aug. 26~~
* Ch 1 Notes – Aug. 27
* Ch 2 Vocabulary – Aug. 30
* QUIZ: Ch 1 & 2 Vocabulary **🡪 Sept. 1**
* TEST: Ch 1 & 2 🡪 Sept. 6

**BIOLOGY 2022-23 LAB ACTIVITY**

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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.

**Observations**

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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: |  |  |  |  |

**Analysis**

Using a spreadsheet app, label the Y-axis with the survivorship data from 0-1000. Use a semi-log graph. 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.

|  |  |
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| M&M™s Statistics: Post-Lab Questions | Description:  logo black |

1. You have learned about 3 kinds of survivorship curves. Which type of curve do you think the M&M™s demonstrates?
2. What are the characteristics of organisms that demonstrate each type of survivorship?

Think about…

* number of hatchlings or births in type of organism
* how long parent cares for young
* length of time for the young to mature
* age (relative to typical lifespan) the organism is more likely to die
1. Type I survivorship curve?
2. Type II survivorship curve?
3. Type III survivorship curve?
4. Why might an ecologist want to construct a life table for a population? Consider the environmental factors that limit a population, examples would be age specific diseases, predators, changes in environment, etc.
5. What might be occurring if a population that typically shows a Type I survivorship curve starts to develop a Type II survivorship curve?
6. What might be occurring is a population that typically shows a Type III curve starts showing a Type II curve?
7. In human populations, do you think there would be a difference in survivorship curves between developed and developing countries? Why?
8. When first looking at the data, what general patterns do you notice?
9. Identify the oldest and the youngest death.
10. Is there an age interval that has an unusually high number of deaths?
11. Is there a difference in overall death rates of males vs. females?
12. Are there differences in age of death compared to year of birth?
13. Can you hypothesize about any outliers (data that doesn’t fit the pattern or seems incorrect)?
14. What do you wonder?
15. You will need to decide how you will sort data on the Excel spreadsheet. What do you want to compare/contrast?