Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Block\_\_\_\_\_\_

**Quadrat Sampling Bean Lab: Estimating Populations of Plants**

**Instructions:**

1. Pick up your supplies (4 Popsicle sticks, one bag of mixed beans, tray)

2. Construct your quadrat by taping 4 Popsicle sticks together and making a perfect square. For this lab, it will 1m2 in size.

3. Spread the mixed bag of beans “organisms” out into your tray “ecosystem”.

4. Randomly drop your quadrat (close your eyes), and record data of the number of different species present

5. Repeat dropping the quadrat for a total of 5 times.

**Section 1: Percent Frequency -** Collect Data and determine the % frequency for each species in the ecosystem. If present, write YES. If absent, write NO.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Quadrat 1** | **Quadrat 2** | **Quadrat 3** | **Quadrat 4** | **Quadrat 5** |
| Northern (white) |  |  |  |  |  |
| Black |  |  |  |  |  |
| Pinto (brown) |  |  |  |  |  |

**Ex.** (Northern beans were found in 4 out of 5 quadrats studied) **Do the math** = 4/5 x 100 = 80.0% Frequency)

*Data Calculations for section 1*:

**Section 2: Density**- Collect data and determine the density of each species (# organisms / 1 m2 area of your quadrat in your ecosystem.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Quadrat 1** | **Quadrat 2** | **Quadrat 3** | **Quadrat 4** | **Quadrat 5** | **Average\*** |
| Northern (white) |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |
| Black |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |
| Pinto(brown) |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |  / 1 m2 |

**Ex.** (10 Northern beans were found in a 1 m2quadrat) **Do the math** = 10/ 1 m2

\*Average Density = total number in all quadrats

 number of quadrats x area of one quadrat

*Data Calculations for section 2:*

**Section 3: Percent Coverage** – Analyze your quadrat and **ESTIMATE** what percent of the quadrat is covered with each species (Do not have to add to 100%).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Quadrat 1** | **Quadrat 2** | **Quadrat 3** | **Quadrat 4** | **Quadrat 5** | **Average % Coverage** |
| Northern (white) |  |  |  |  |  |  |
| Black |  |  |  |  |  |  |
| Pinto (brown) |  |  |  |  |  |  |

**Ex.** (Northern beans covered 2/3 of the quadrat) **Do the math** = 2/3 x 100 = 66.6% Coverage with Northern)

*Data Calculations for section 3*:

**Conclusion Questions**

1) Why was it necessary to close your eyes before dropping the quadrat?

2) Which was the dominant plant species within the site? What data tells you that?

3) How do your density averages compare to the population densities of the individual quadrats? Were the populations spread out evenly over the site?

4) Below is a picture of two 1m2 quadrats and the species found in them (species W, X, Y, and Z).

Quadrat 1 Quadrat 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | X | X | W | W |
| W | X | X | W | X |
| W | X | X | X | X |
| W | X | W | X | W |
| W | Z | W | W | Y |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Z | Z | Z | W | W |
| W | Z | Z | Z | Z |
| W | Z | Z | W | Z |
| W | X | W | Z | W |
| W | Z | W | W | W |

(a) Calculate the percent frequency for species Y and for species X.

(b) Calculate the percent coverage for species W in Quadrat 1.

(c) Calculate the density of species Z in Quadrat 2.