Lab Station: Dispersion Patterns

Introduction: A population is a group of organisms that belong to the same species and live in a particular place at the same time. The study of populations is quite different than the study of individuals composing the population. Populations are defined by several properties such as size, density, dispersion, and patterns of mortality. At this station you will learn about patterns of dispersion within populations. A dispersion pattern is the spatial relationship between members of a population within a habitat, often characteristic of a particular species.

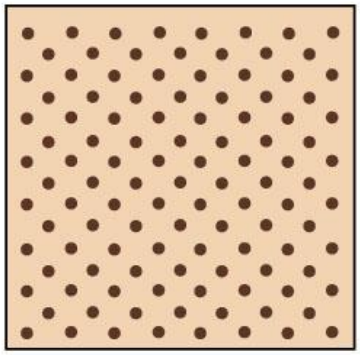
Directions:

1. Answer questions 1 – 3 on your student worksheets.
2. At this station you will use pieces of colored paper to illustrate the three types of dispersion patterns. Locate the hole punches of three different colors of paper and the stick glue.
3. Complete questions 4 – 6 for each dispersion pattern, giving: (1) the name of the pattern, (2) a description of the pattern, (3) reasons organisms arrange themselves in this pattern, and (4) an example of this pattern in nature.
4. In each box on your student worksheets you will illustrate each pattern of dispersion using circular pieces of colored paper. Use the LEAST amount needed to demonstrate. Each circle of paper represents an organism in the population. Glue (or tape) the "organisms" into the boxes on your student worksheets to accurately illustrate each pattern of dispersion.

Tasks:

- Illustrate dispersion patterns using colored paper "organisms."
- Complete all questions on the student worksheets.
- Clean your lab area before moving to the next station.

Uniform Dispersion

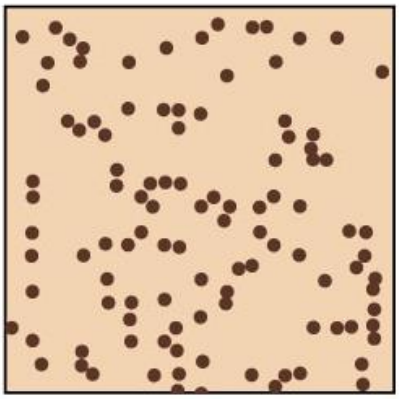


Uniform

Uniform dispersion is observed in plant species that inhibit the growth of nearby individuals. For example, the sage plant, *Salvia leucophylla*, secretes toxins, a phenomenon called negative allelopathy. The chemicals kill off surrounding plants in a circle around the individual sage plants, leading to a uniform distance between each plant. Animals that maintain defined territories, such as nesting penguins, also exhibit uniform dispersion.

Purple Sage – *Salvia leucophylla*

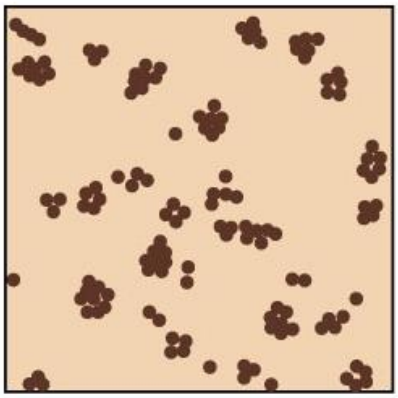
Random Dispersion



Random

Random dispersion. In random dispersion, individuals are distributed randomly, without a predictable pattern. An example of random dispersion comes from dandelions and other plants that have wind-dispersed seeds. The seeds spread widely and sprout where they happen to fall, as long as the environment is favorable—has enough soil, water, nutrients, and light.

Clumped Dispersion



Clumped

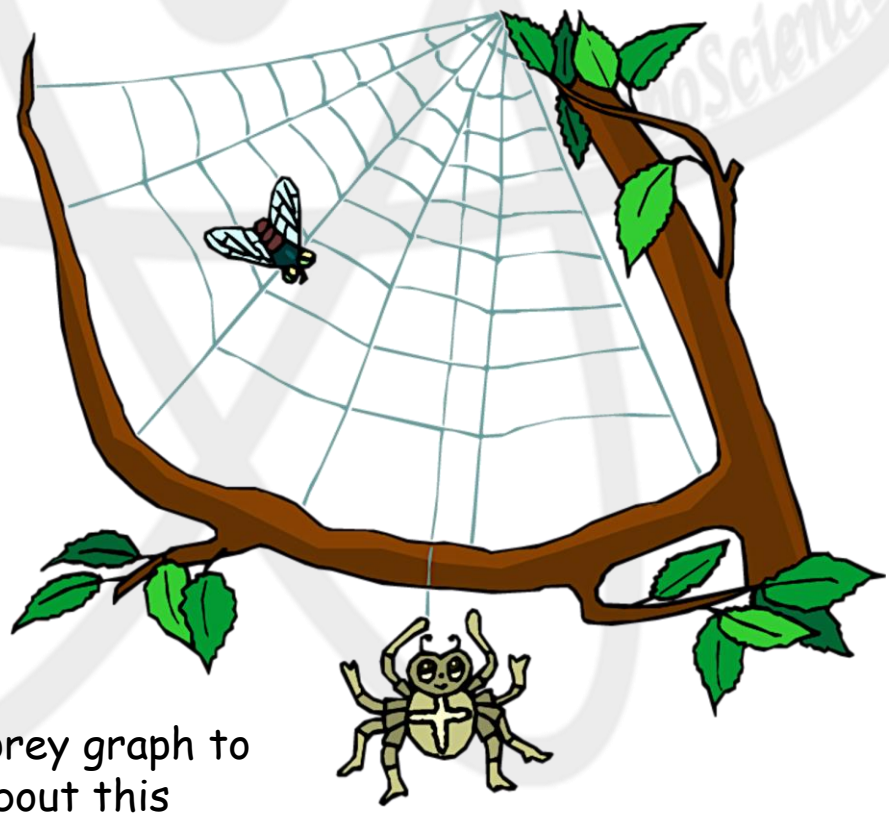
Clumped dispersion. In a clumped dispersion, individuals are clustered in groups. A clumped dispersion may be seen in plants that drop their seeds straight to the ground—such as oak trees—or animals that live in groups—schools of fish or herds of elephants. Clumped dispersions also happen in habitats that are patchy, with only some patches suitable to live in.

Lab Station:
Predator – Prey Relationships

Introduction: Charles Elton was a pioneer in the study of ecology. Elton obtain the records from the Hudson Bay Company of Canada showing the number of lynx and snowshoe rabbit pelts that were bought and sold over a 70 year period of time. The number of pelts purchased by the Hudson Bay Company is an indication about the size of each population. The predator-prey relationship is one example of a "limiting factor."

Directions:

1. At this lab station you will find a diagram labeled "Predator-Prey Relationships."
2. Study this diagram and use the information from the diagram to complete the questions on your student worksheets.

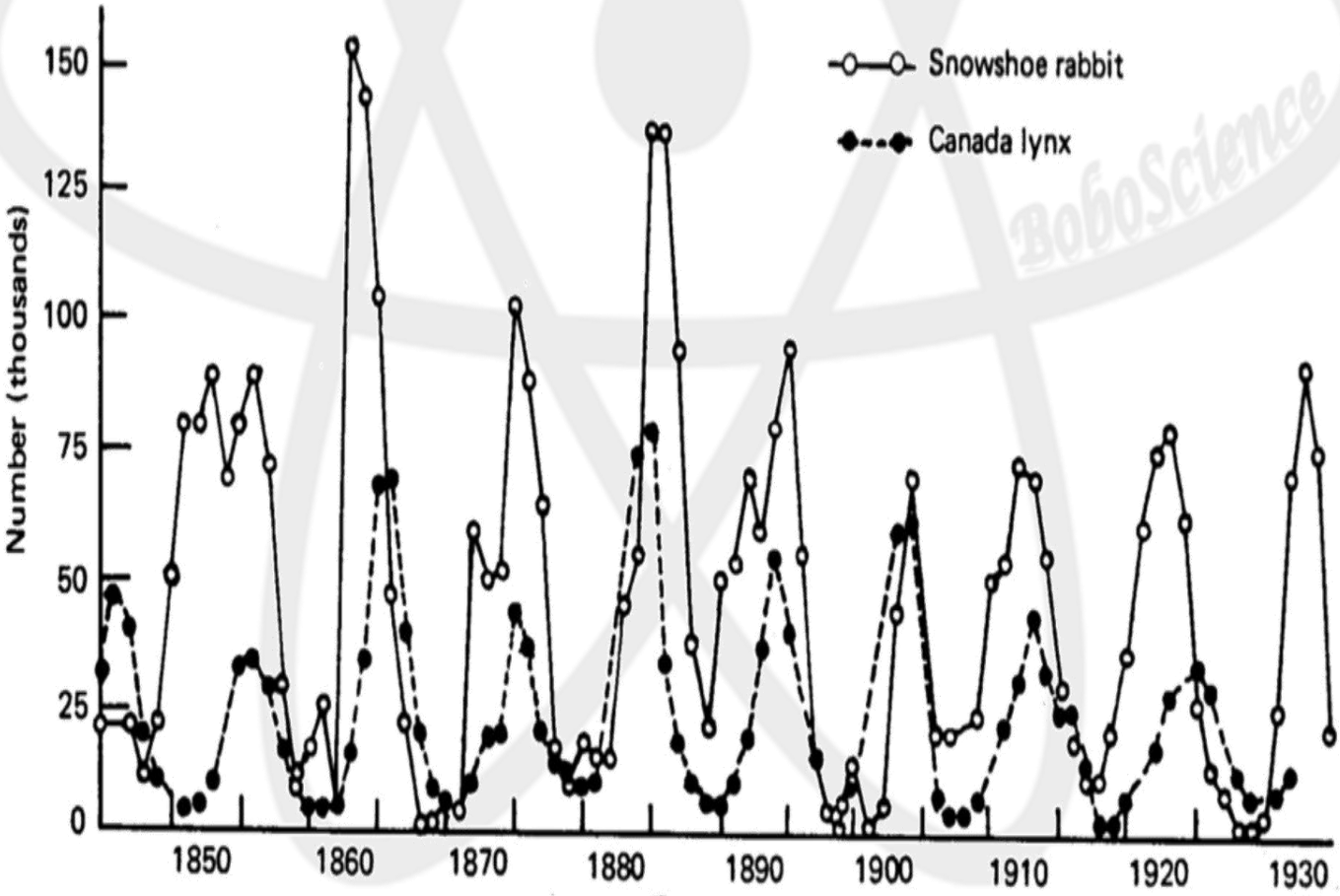


Task:

- Use the predator-prey graph to answer questions about this ecological relationship.

Predator-Prey Relationships

This classic set of data involves the Canadian lynx and the Snowshoe rabbit. This data comes from the trapping records established by the historical Hudson Bay Company, which was heavily involved in the fur trade. During the 1800's and into the early 1900's, trappers collected and sold the pelts of both the Canadian lynx and the Snowshoe hares. Examining the records that were kept of the number of pelts bought by the Hudson Bay Company over a seventy year period reveals the nature of the relationship between the predator (lynx) and the prey (hare).



Lab Station: Population Density

Introduction: When studying a population, you are studying a group of organisms that are all the same species. However, it is impossible to truly understand a population without looking at the biotic and abiotic influences upon that population. At this station you will explore population density as well as how one population might affect another population.

Directions:

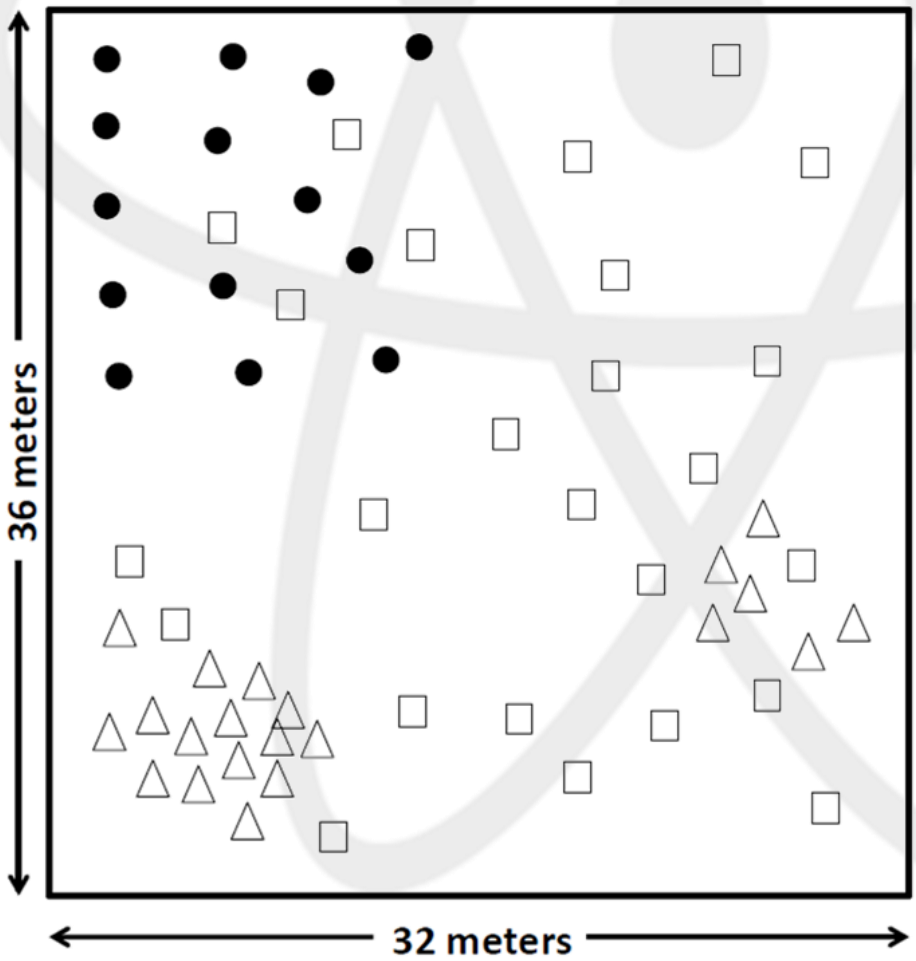
1. Look at the population density diagram found at this lab station. A scientist is conducting a survey to study the interactions between three types of wildflowers in a large meadow. The scientist wants to calculate the population density of each species, but the field is too large to count every single plant. The scientist decides to count all of the flowers in a smaller area and use the data to represent the entire field.
2. Count the total number of each wildflower seen on the population density grid. Record the data on your student worksheets. You can mark on this sheet.
3. Complete all calculations and questions on your student worksheets.

Tasks:

- Carry out the wildflower count.
- Calculate population densities.
- Complete all questions on the student worksheets.
- Retrieve a new Population Density Page for the next group.

Population Density

The grid below represents a small section of a large meadow. A scientist is conducting a survey o study the Interactions between three types of wildflowers that grow in the meadow. Rather than counting all plants in the meadow, the scientist counted the plants in the area seen below. Count the number of each plant and record the data on your student worksheets.



Key:

Wildflower A is represented by squares on the grid to the left.

Wildflower B is represented by circles on the grid to the left.

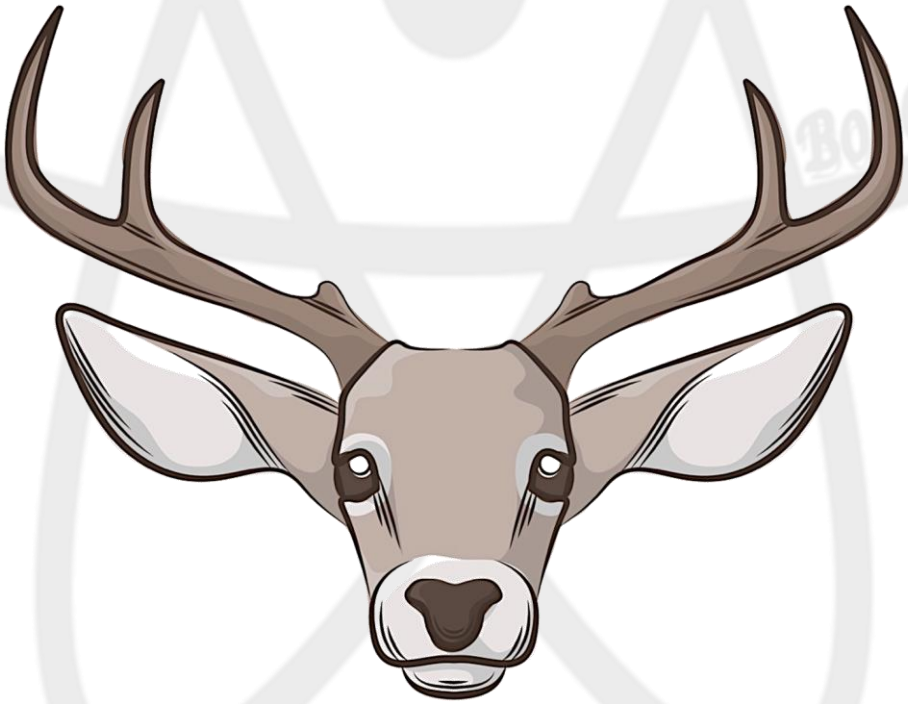
Wildflower C is represented by triangles on the grid to the left.

Lab Station: Carrying Capacity

Introduction: St. Paul Island is located in the Bering Sea off the coast of Alaska. In 1911, 25 reindeer were introduced on the island. Of the 25 individuals, 4 were male and 21 were female. The reindeer had no natural predators and hunting of the reindeer was not allowed. Over a 40 year period the population size was recorded. This data is seen in the chart below. At this station you will investigate the reindeer population and the carrying capacity of St. Paul Island.

Directions:

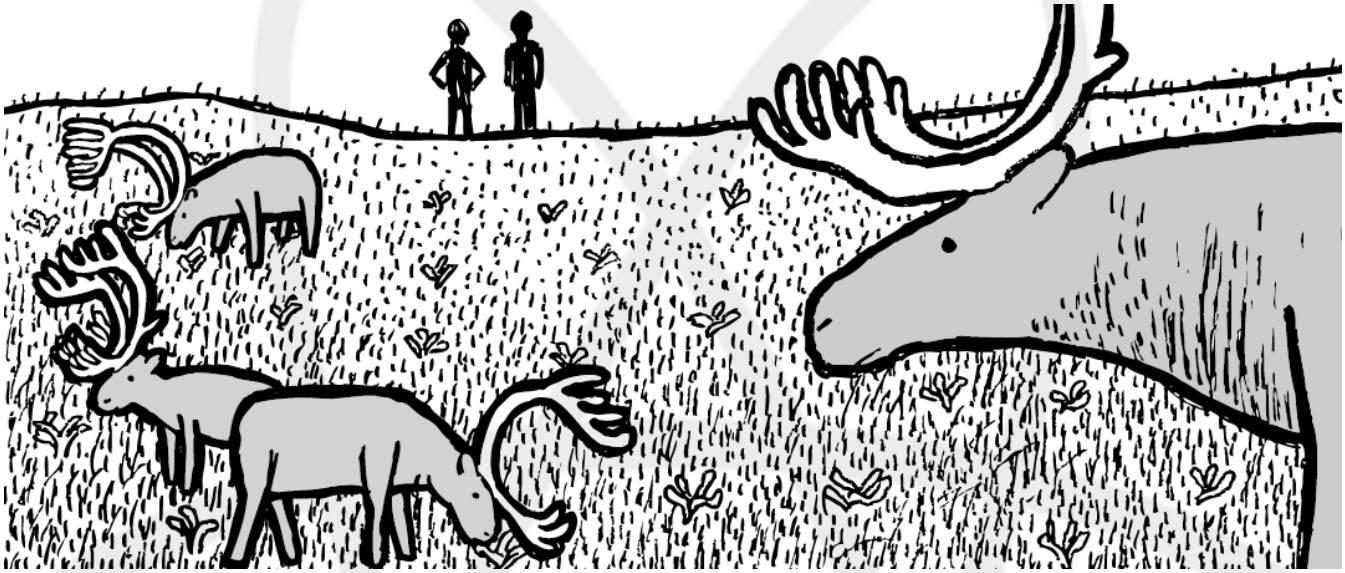
1. Locate the diagram called "Reindeer Population Study." Use the data in the chart to prepare a graph showing the reindeer population over the 40 year period.
2. Complete all questions on your student worksheets.



Tasks:

- Complete a graph of the reindeer population data.
- Complete all questions on the student worksheets.

Reindeer Population Study



Year	Size of Population	Year	Size of Population
1911	25	1938	1880
1916	201	1939	1250
1919	248	1942	925
1921	360	1943	750
1923	249	1944	500
1927	359	1945	325
1932	538	1947	320
1934	1250	1948	230
1937	2000	1950	8

Lab Station: Ecosystem Builder

Introduction: Use the space provided to build and demonstrate the layers of and ecosystem.

Directions:

1. Locate the student worksheet called "Ecosystem Builder." Your knowledge of the parts of an ecosystem to fill in the missing information.
2. Complete all tasks and questions on your student worksheets.

Tasks:

- Create an ecosystem.
- Complete all tasks and questions on your student worksheets.