

Predator Prey Simulation Lab

Purpose: To simulate the interactions between predator species and prey species and how those interactions effect population numbers.

Materials Needed (per group of students working in pairs)

1. Ecosystem (Desk or Table Top)
2. 300 beans representing rabbits
3. 12 wolves (post-it notes)
4. Data Recording Sheet
5. Graphing paper

Hypothesis: If populations of wolves and rabbits effect each other during predation, then a standard predator-prey curve will be formed when population data is graphed.

Procedure:

1. Your tabletop represents your ecosystem. Randomly place 3 rabbits (beans) in the ecosystem.
2. Allow your wolf to "hunt" by dropping from a height of approximately 12 inches. If the wolf lands on a prey, it survives, if it misses, the wolf dies.

(It is impossible for your wolf to survive at this point).

3. If a wolf survives, it has an offspring. All surviving rabbits double with each generation.
4. If the wolf dies, a new wolf migrates in. Record your number of wolves and rabbits at the end of each round.
5. Repeat for 25 generations, adding wolves that reproduce, doubling surviving rabbits.
6. Record number of wolves and rabbits at the beginning of each round.

Rules:

- a. The carrying capacity for rabbits is 200, even if you should have more with reproduction.
- b. The carrying capacity for wolves is 12, even if you should have more with reproduction.
- c. Wolves must catch at least one prey to survive and reproduce, but may land on multiple prey.
- d. If all rabbits/wolves should die, begin again with 1 wolf and 3 rabbits.

Data Table

Construct a Double Y axis graph:

- a. label the X axis 1-25
- b. Label the left Y axis Rabbits, label 1-200.
- c. Label the right Y axis Wolves, label 1-12
- d. Graph data points and connect to form a line graph

Conclusions; Answer the Following Questions

1. What is the relationship between the predator line and the prey line on the graph?

2. What would have happened to the rabbit and wolf populations there had been more than one type of predator, as is common in nature?

3. What sort of growth curve is exhibited by the rabbit population?

4. What would happen to the rabbit population if all the wolves were killed by hunters?

5. What is carrying capacity?

6. What is the approximate ratio of rabbits to wolves when the meadow is at carrying capacity for both?

| Generations | Rabbits | Wolves |
|--------------------|----------------|---------------|
| 1 | 3 | 1 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
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| 25 | | |