**Simulating a Predator - Prey Relationship** Name

**Objectives:** This lab simulates the interactions between a predator population of lynx and a prey population of rabbits in a meadow. After collecting the data, the student graphs the data and analyzes the interaction between the two populations.

**Background:** Students should be able to define a food chain, population, immigration, predator and prey.

**Materials:**

* one 7.5 cm cardboard square (the lynx)
* 140-150 2.5 cm paper squares (the rabbits)
* 61 cm square section of table top (the meadow)
* masking tape (to mark off the meadow)
* **TO HAND IN:** data table, graph, analysis questions (each student completes their own set)

**Procedure: (work in a pair to complete the data table)**

1. Distribute 3 rabbits in the meadow. Always spread the rabbits around evenly.
2. Toss the lynx square once in an effort to catch a rabbit. The lynx needs to catch 3 rabbits in order to survive and reproduce. At this point in the activity there is no way that the lynx can catch 3 rabbits. The lynx is not allowed to skid or slide around in the meadow.
3. Complete the data table for generation #1. The lynx will starve and there will be no new baby lynx.
4. At the beginning of generation #2 double the rabbits left at the end of generation #1. A new lynx immigrates into the meadow if your lynx all die out. Be sure to spread the rabbits evenly around the meadow. Always double the number of rabbits remaining to make the next generation.
5. Eventually the rabbit population increases to a level that allows the lynx to catch 3 rabbits in a single toss. If the lynx catches 3 rabbits it not only survives but it reproduces too! It has one baby lynx for each 3 rabbits that it catches. Therefore, if it catches 6 rabbits it will have 2 babies. Lynx are not allowed to cheat, but they should try to be efficient. Stupid lynx result in an overabundance of rabbits.
6. As the number of lynx increases throw the cardboard square once for each lynx. Record the number of rabbits caught by each lynx. The simulation is more realistic if the number of new baby lynx is based on each lynx`s catch rather than merely the total number of rabbits caught in a generation.
7. There are always at least 3 rabbits at the beginning of a generation. If and when the entire rabbit population is wiped out, then 3 new rabbits immigrate into the meadow to start over.
8. Remember that the number of rabbits in the meadow needs to be correct at all times. Remove the rabbits caught and add new ones for the next generation as indicated by your data table.
9. Model 18 or more generations as time allows. After 18, you may predict the rest up to a total of 25 generations. Base your prediction on the pattern you observed during the first 18 generations.

**Analysis:**

1. Graph your data for 25 generations (the first 3 columns). Place both the rabbit and the lynx data on the same graph so that their interaction can be easily observed. Label the y-axis "Number of Animals" and the x-axis "Generations." Use one color of line for rabbits and another color for lynx.

Answer #2-#5 on a separate piece of paper. Staple all 3 papers together to hand in (graph, analysis, table).

1. What happened to the rabbit population during the first few generations? What happened to the lynx population during this same period?
2. What happened to the rabbit population after many generations? What happened to the lynx population?
3. Based on your graph, describe the trends in population sizes between rabbits and lynx that you observed.
4. Suppose that you were given an unlabeled graph of rabbit and lynx populations. Given what you observed on the graph you made, how could you infer which curve represented the rabbits and which curve represented the lynx?

**Data Table -- Predator-Prey Simulation**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Generation** | **Rabbits** | **Lynx** | **RabbitsCaught** | **LynxStarved** | **Lynx Surviving** | **New Baby Lynx** | **Rabbits Left** |
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