

NAME: _____

Date: _____

Section: _____

INS2 - Predator Prey Simulation

There is a fine balance in nature that makes our ecosystem work. During this activity you will simulate the relationship between a population of predators and their prey by studying the interactions between a lynx population and a hare population in a meadow. After collecting sufficient data, you will graph the results and then extend the graph to predict the populations for several more generations.



Background:

Before doing the Lab you need to define:

Food chain:

Population:

Migration (migrate):

Predator:

Prey:

Materials:

one 7.5 cm cardboard square (the lynx); about 250 2.5 cm construction paper squares (the hares); a 61 cm square section of table top (the meadow); masking tape or other material to mark off the meadow; data table; graph paper.

Procedure:

1. Distribute 3 hares randomly in the meadow.
2. Toss the lynx square once in an effort to catch a hare. (At this point in the activity there is no way that the lynx can catch the 3 hares that it needs to survive and reproduce. The lynx is not allowed to skid and the hares should be distributed in the field.)
3. Complete the data table for generation #1. The lynx will starve and there will be no surviving lynx or new baby lynx.
4. At the beginning of generation #2 double the hares left at the end of generation #1. A new lynx migrates into the meadow. Be sure to disperse the hares in the meadow.
5. Eventually the hare population increases to a level that allows the lynx to catch 3 hares in a single toss. If the lynx catches 3 hares it not only survives but it reproduces too! It has one baby lynx for each 3 hares that it catches. Therefore, if it catches 6 hares 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 hares.
6. As the number of lynx increases throw the cardboard square once for each lynx. Record the number of hares 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 hares caught in a generation.
7. There are always at least 3 hares at the beginning of a generation. If and when the entire hare population is wiped out, then new hares migrate into the meadow.
8. Remember that the number of hares in the meadow needs to be correct at all times. Remove the hares caught and add new ones as indicated by your data table.
9. Model about sixteen generations and predict nine more or up to a total of 25 generations. Base the prediction on the pattern observed during the first sixteen generations.

Analysis:

Graph the data for 25 generations. Place both the hare and the lynx data (the first two columns of the data table) on the same graph so that the interrelationship can be easily observed. Label the vertical axis "Number of Animals" and the horizontal axis "Generations." Use different colors for hares and lynx.

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Resources: This simulation is a classroom adaptation of a game produced for home use by Urban Systems Inc. many years ago. Other versions in use include owl and mice, etc. You may wish to introduce disturbances in the cycle such as killing off the lynx or starving the hares. This activity serves as a good introduction to data modeling.

Predator-Prey Simulation Data Table

Generation	Hares	Lynx	Hares Caught	Lynx Starved	Lynx Surviving	New Baby Lynx	Hares Left
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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