SNC 1D Ecology Population Case Study: Predator-Prey Relationship

In this case study you will investigate one of the most famous sets of data ever collected on a predator prey relationship. The data come from very thorough records kept by the Hudson's Bay Company over many years. Though old, these data demonstrate the classic predator-prey relationship.

Lynx, a cat of the boreal forest, prey on snowshoe hare. In some areas, hare provide over 70% of the lynx diet. As a result, the population growth curve of the lynx should show a relationship to that of the hare. What do you think that relationship is?

The data on this relationship are in Table 1. Study them carefully as you answer the questions that follow. Use complete sentences.

Table 1: Population Numbers of Hare and Lynx by Year

Year	Hare Numbers	Lynx Numbers
1895	85 000	48 000
1900	18 000	6 000
1903	65 000	18 000
1905	40 000	61 000
1908	28 000	28 000
1909	25 000	4 000
1910	51 000	10 000
1912	70 000	32 000
1915	30 000	42 000

Year	Hare Numbers	Lynx Numbers
1918	5 000	5 000
1921	52 000	11 000
1924	78 000	28 000
1927	18 000	42 000
1930	4 000	5 000
1933	22 000	18 000
1934	86 000	32 000
1936	15 000	40 000

Questions:

Graph these data on the same sheet of graph paper. Put the year on the X-axis and the population numbers on the y-axis. Use a different colour for the growth curves of hare and lynx. (Note: Give the graph a title, Label the axes and state the units, include a legend for the two growth curves, print, and use a pencil. Neatness counts!)

1. a) These population growth curves are said to fluctuate. What does this mean?

   b) How many years are there in one fluctuating cycle of the hare population?

2. What factors may be responsible for the unusual number of hare in 1895?

3. a) Why does the hare population number fluctuate?

   b) Why does the lynx population number fluctuate?

4. We say that a good predator-prey relationship keeps the two populations “in balance”. What does this mean?

5. a) Lynx skins are quite valuable today. What would happen if trapping regulations were abolished and all the lynx in a large area were killed?

   b) Are trappers likely to kill all the lynx in an area, even if regulations were abolished? Discuss.