

## Wolves and Deer: Population Change

**Background:** In 1970 the deer population of an island forest reserve was about 2000 animals. Although the island had excellent vegetation (plants) for feeding, the island was only 518 square kilometers and the food supply obviously had limits. The forest management personnel feared that overgrazing (too much eating of grass) might lead to mass starvation of the deer. Since the area was too remote (isolated) for hunters to control the deer population, the wildlife service decided to bring in natural predators. It was hoped that natural predation would keep the deer population from becoming too large and also increase health of the deer population, as predators often eliminate the weaker members of the herd. In 1971, ten wolves were flown into the island.



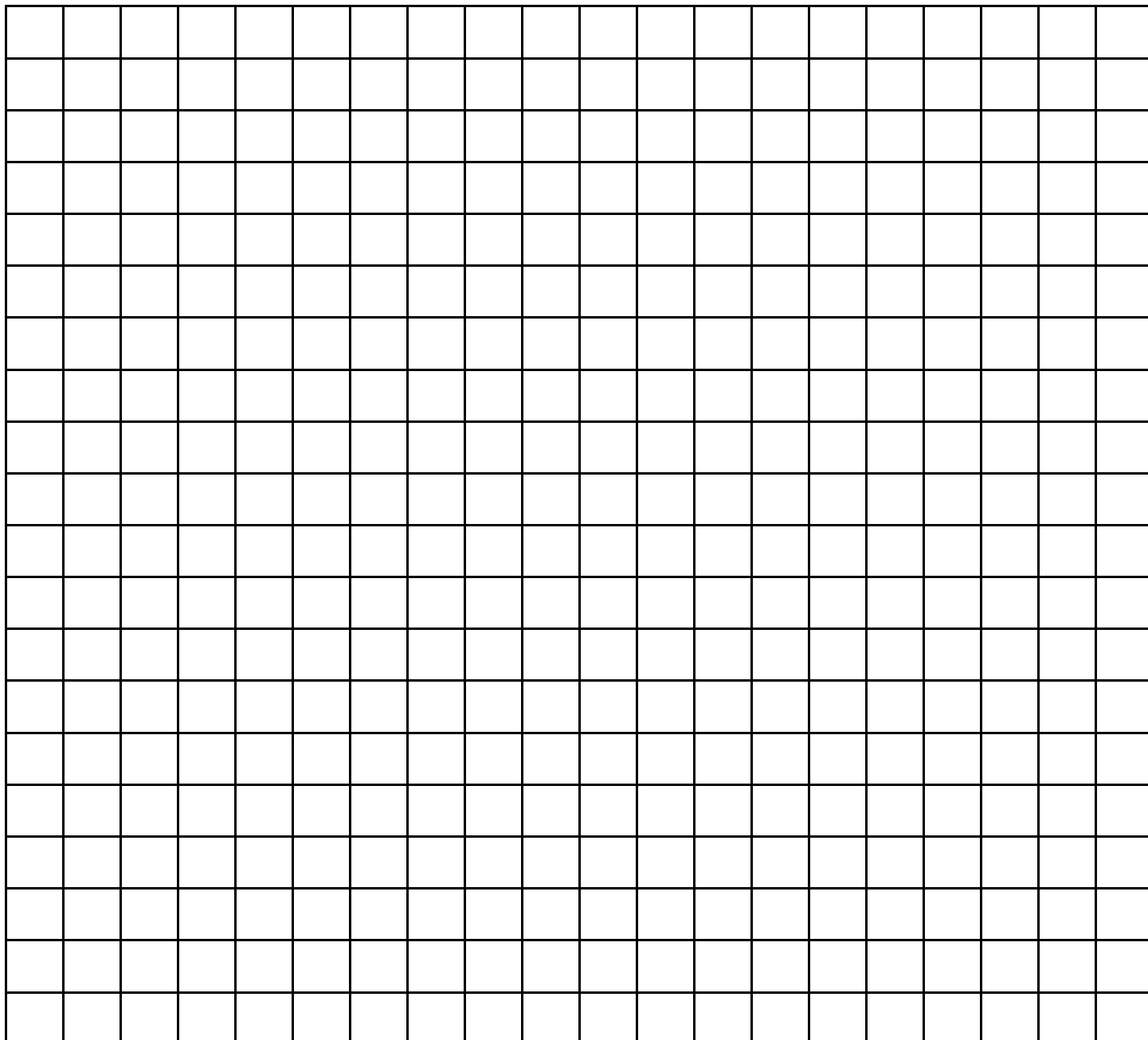
The results of this program are shown in the following table. The Population Change is the number of deer born minus the number of deer that died during that year. Fill out the last column for each year (the first has been calculated for you).

$$\text{Deer Population Change} = \text{Deer Offspring} - (\text{Predation} + \text{Starvation})$$

Year	Wolf Population	Deer Population	Deer Offspring	Predation	Starvation	Deer Population Change
1971	10	2,000	800	400	100	+300
1972	12	2,300	920	480	240	
1973	16	2,500	1,000	640	500	
1974	22	2,360	944	880	180	
1975	28	2,244	996	1,120	26	
1976	24	2,094	836	960	2	
1977	21	1,968	788	840	0	
1978	18	1,916	766	720	0	
1979	19	1,962	780	760	0	
1980	19	1,982	790	760	0	

**Calculation:** Calculate the average wolf population size between the years of 1971 to 1980. Show set up and answer. Make sure to include the units.

**Graph:** Graph the deer and wolf populations on the graph below. Use one color to show deer populations and another color to show wolf populations.



**Analysis Questions:** Answer the following using complete sentences.

1) Describe what happened to the deer and wolf populations between 1971 and 1980. What is the trend?

2) Predict what you think would have happened to the deer on the island had wolves NOT been introduced? What is your evidence for this?

3) Can an ecosystem support an infinite number of deer? Why or why not?

4) If wolves had not been brought to the island, what factors might influence the deer population size? Describe at least two.

5) How do tertiary predators like the wolf or orca (killer whale) contribute to the health of an ecosystem?

6) Orcas eat sea otters. In the space below, draw a graph that includes two lines (one line for orcas and one for sea otters) in which the predatory-prey relationship of the orca and sea otter is seen. Make sure to label the lines.



**Extra Credit/Honors Challenge:**

7) How does one determine when an ecosystem is in "balance"?

8) Is death by predators more natural or "right" than death by starvation?